

# SOUTHERN POWER AND INDUSTRY

**AUGUST, 1955**

**WORK AREAS ..... 49**

*Modern electronics manufacturing plant—N.C.*

**OUTDOOR STATION ... 48**

*Public Service Co. of Oklahoma's Southwestern Station*

**BUS SUPPORTS ..... 50**

*Re-installation technique of Lockheed Aircraft—Ga.*

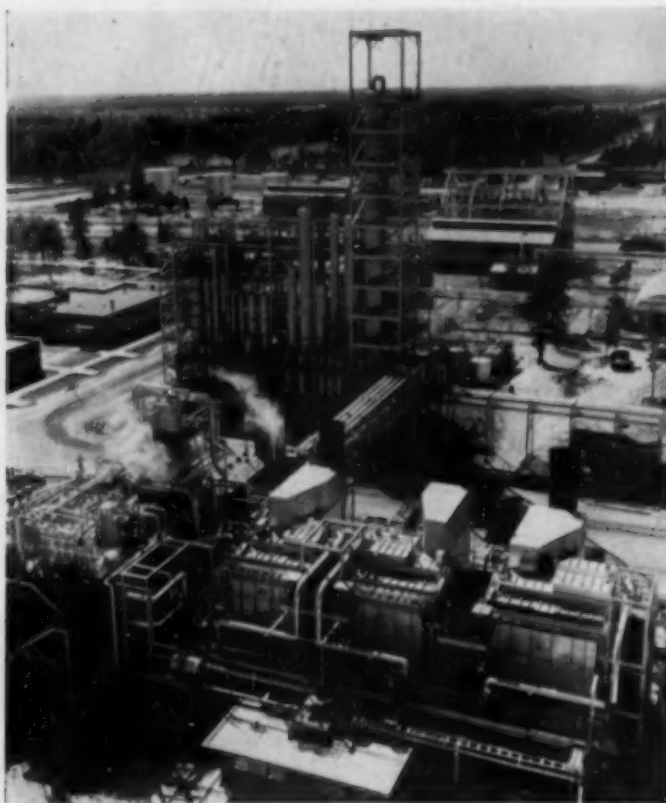
**SHUT-OFF CHARTS .... 48**

*Plant service emergency controls serve Texas plant*

**Complete Contents on Page 3**

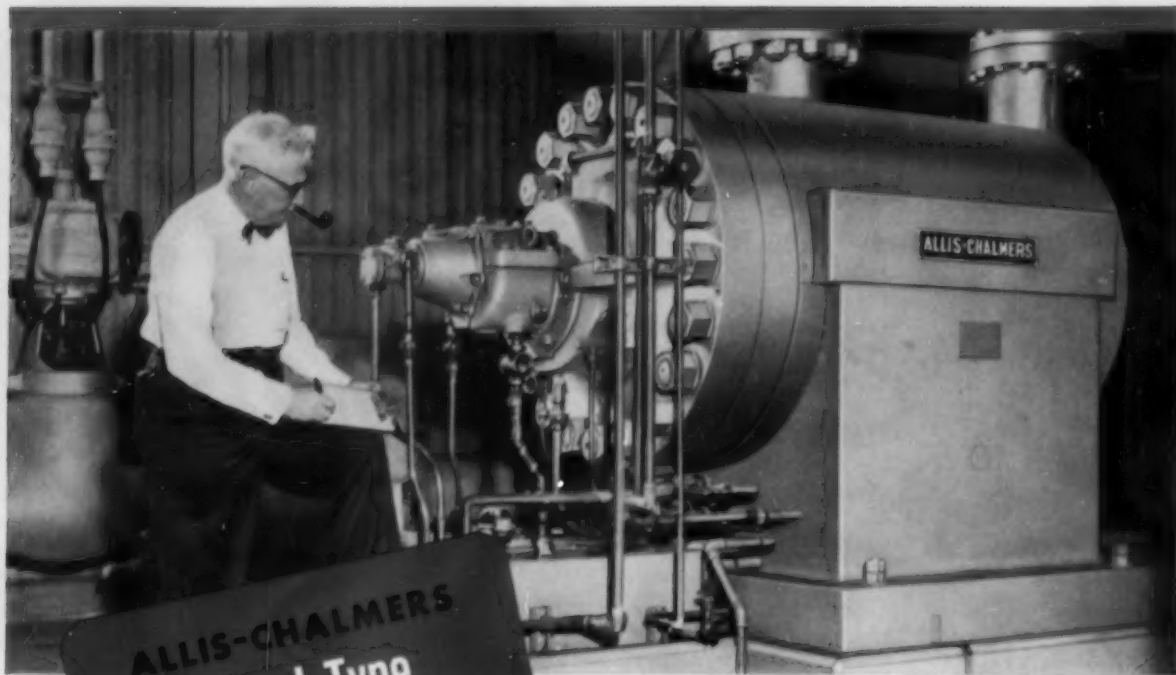


## TEXAS EASTMAN EXPANDING To Make More Oxo at Longview



Portion of Texas Eastman plant at Longview. Oxo reactor area is in background.

Continued growth of demand has made necessary an increase in plant facilities, less than three years after production was first begun at the Eastman plant in Longview, Texas. (See page 10.)



**ALLIS-CHALMERS**  
**Barrel-Type**  
**BOILER FEED PUMPS**

# In the Dallas Steam Electric Station OF THE DALLAS POWER & LIGHT COMPANY

## What Are Your Pump Needs?

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# ALLIS-CHALMERS



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Volume 73

Number 8



*Ultra Modern Headquarters — Metropolitan Edison Company, Reading, Pa.*

## BRINGING COMFORT TO 600 EMPLOYEES

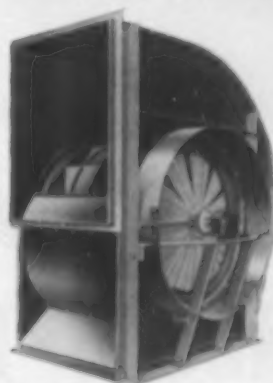
by use of Clarage Equipment with the Heat Pump

Throughout this modern building, containing 190,000 square feet of floor space, air handling is by Clarage equipment.

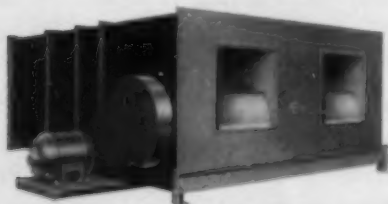
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A Texaco Lubrication Engineer will gladly give you more specific information. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.



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# SOUTHERN POWER AND INDUSTRY

Vol. 73  
No. 8

AUGUST  
1955

NBP



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## Feature Articles in This Issue

### Design, Operation and Maintenance

Planned Work Areas at Western Electric—North Carolina.....	40
Public Service Company of Oklahoma's Southwestern Station.....	45
Re-Installation of Micarta Bus Supports in Georgia Plant.....	50
Push Button Weighing and Mixing in Alabama Mill.....	52
Recent Advancements in the Power Field.....	56
Steel Grating Floor Cuts Texas Plant's Maintenance Costs.....	64
High Purity Water at Low Cost—G.E., Kentucky.....	66
Plant Service Shut-Off Charts Serve Texas Plant.....	68
New Reactors Will Cut Atomic Power Costs.....	70
Training Program for Power Plant Personnel—Missouri.....	72

### Helping the Man-in-the-Plant

Outside Lighting Control.....	49	Camera Saves Dollars.....	84
Insulating Boiler Settings.....	80	Difficult Cleaning Problem.....	84
Improved Drive Assembly.....	81	Aid to Instrument Repair.....	84
Plastic Protective Coating.....	81	Oil Level Sight Gauge.....	86
Safety Boners Noted.....	82	Detecting Leaky Valves.....	86
Solving Wiring Problems.....	82	Silica Carry-Over.....	86

### Regular Features — Departments

Facts and Trends.....	4	Timely Comments.....	37
News of the South.....	10	Industry Speaks.....	39
Future Events.....	12	New Equipment.....	88
Buyers Information.....	16	Index to Advertisers.....	112

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# Facts and Trends

## FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

August, 1955

- **THE SOUTHWESTERN STATION**--Public Service Company of Oklahoma's first experience with totally outdoor station design consists of two 80,000 kw units. Designed for an ultimate capability of 500,000 kw, this station is now the largest on the system, which consists of seven major plants with a capability of 416,500 kw.

R. O. Newman, formerly Chief Engineer of the Southwestern Station and now Assistant to the Superintendent of Operation and Construction, reports on the design and operating features in this issue. The station challenged the ingenuity of both designers and the operating personnel to adequately protect the instruments, piping and equipment, which are out of doors. Results have been quite gratifying. There have been no outages due to the outdoor installation, nor has there been any loss of instrumentation or piping due to freeze-ups.

- **NON-WOVEN FELTS** of "Teflon" tetrafluoroethylene fiber are being produced by the Du Pont Company's Fabrics Division in pilot plant quantities for industrial filters. Felts of "Teflon" can withstand temperatures up to 400 F almost indefinitely and are so resistant to chemicals they can be boiled in aqua regia or fuming sulfuric acid with no adverse effect.

These properties fit "Teflon" felts for filtering applications where heat, corrosive chemicals, or both are a problem. Because of its low affinity for water, the new material is also being used to substantially improve the efficiency of equipment designed to remove water vapor from air going to compressors.

- **WHAT! NO SMILE?** Lonesome when you move from attendant-operated to automatic elevators? Otis Elevator Company's newest advance "Elevoice" consists of loudspeakers in each elevator connected with one or more master drums (usually located in machine room) on which any number of messages are electrically recorded. The drums, rotating every three seconds 24 hours a day, "pipe" to each elevator at any time of the day or night the message appropriate to its movements.

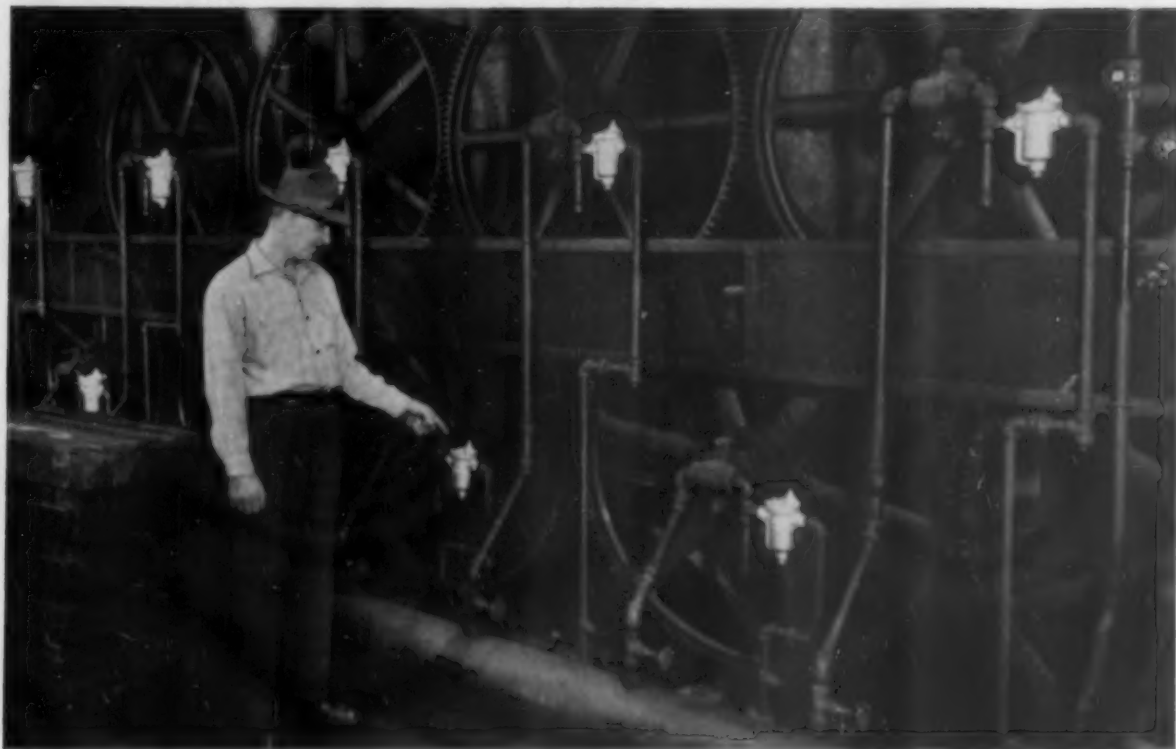
- **FIELD INSPECTION WORK**--Carbide and Carbon Chemicals Company at Texas City, Texas, has for some time made extensive use of standard magnetic particle inspection equipment. However, use of such equipment is prohibited in areas which might be subject to flammable gas release.

What the maintenance men needed for field inspection work was a piece of equipment which was easily moved about, and, at the same time, presented little or no hazard insofar as being a source of ignition.

A Magnaflux Corporation portable inspection tool and kit (Type Y-5 Yoke) has satisfactorily filled the bill. The portability of the equipment makes it convenient for checking tall items of equipment from a scaffold or from a ladder, and reduces idle time which would be required if another type of inspection method had to be used. M. H. VanManen of Carbide and Carbon's Process Safety Department, will report on the use of this equipment in an early issue of SP&I.

(Continued on page 6)

## The Steam Traps That Didn't Cost a Penny . . .



### 10% Fuel Savings Paid for These Armstrongs

#### Nobody loves the coal man

—When you can save 2000 to 3000 pounds of coal per day, it doesn't take long to completely pay for an Armstrong steam trap installation. That's the way it worked at Beloit Boxboard Co., Beloit, Wisconsin. Mr. Edward Kasten, Plant Engineer, is shown above pointing to a No. 812 Armstrong trap, list price \$23. Every 3 or 4 days one of the traps pictured was paid for in full at the expense of the coal man. For a bonus, there had been absolutely no repair costs on these traps at the end of three years service.

#### Are such savings common?

—More often than not, the replacement of leaky or obsolete or improperly sized steam traps with new Armstrongs results in worthwhile fuel savings. Some of the best engineered plants in the country have experienced this.

**The reasons**—Start with a good steam trap design. Add to it shop men who have made more industrial steam traps than any other group in the world. Then, add to that the best trained, most experienced trap sales-engineering group in existence. Season the whole affair with the Armstrong

unconditional guarantee of "complete satisfaction or your money back". You can't buy any product anywhere with closer to 100% assurance that it is going to give you good results. In the case of steam traps, one of those results is often fuel savings.

Why not take another good look at your trapping? Call your local Armstrong Factory Representative (listed in many classified phone directories and in Thomas Register), or write to Armstrong Machine Works, 806 Maple St., Three Rivers, Michigan.



*Application Engineered*

## ARMSTRONG STEAM TRAPS

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... the 44-page "Steam Trap Book" is really a handbook of steam trapping—trap data plus selection, installation and maintenance information. Free on request without obligation.

Armstrong traps also catalogued in Sweets and Chemical Engineering Catalog.



## Facts and trends (continued from page 4)

- **FLORIDA PUMPING STATION**--One of the world's largest pumping stations has gone into service as the heart of a gigantic flood-control system mid-way between Lake Okeechobee and West Palm Beach, Florida. The station houses six 116 in. Fairbanks-Morse horizontal axial-flow propeller pumps, each with a capacity of 360,000 gpm.

A combined capacity of 2,160,000 gpm makes this the world's largest low-lift pump plant. Each of the Florida pumps is driven by a 1600 hp Fairbanks-Morse opposed-piston diesel, making this also the world's largest self-powered pumping station.

- **TRAINING TECHNIQUE**--Too often, power plant operators are expected to operate a new plant efficiently without specific training because it is assumed that previous operating experience constitutes adequate training.

An extensive training program for power plant operators is described in this issue by Harold Grasse, Project Engineer, Black & Veatch, Consulting Engineers of Kansas City, Missouri. Organization, preparation of operating instructions and the methods used to teach the subjects in the classroom and during start-up are included.

Operators having limited experience in existing stations were trained in eight months to operate a new unit plant. Their level of proficiency after this training was equivalent to, and perhaps greater than, that which they might have attained through several years of operating experience.

- **COAL HANDLING AT TVA**--A network of nearly three miles of rubber conveyor belts, operating in four directions at once, keeps 1,400 tons of coal an hour flowing into the nation's largest electric power producing steam plant near Paducah, Kentucky.

Elevated sections of the belt (B. F. Goodrich installation) speed overland on towers raised as high as 50 ft above the ground. The belts go up steep grades, span a river channel and road, probe underground for short runs to reach a 1,450,000 ton stockpiling area.

The multiple belt-road delivers 14,000 tons of fuel a day for the ten 150,000 kw generating units at the New TVA Shawnee plant at Chiles, Ky. Power is fed to the gaseous diffusion plant operated by the A.E.C. at Paducah, Ky. Full operation is scheduled for late this year.

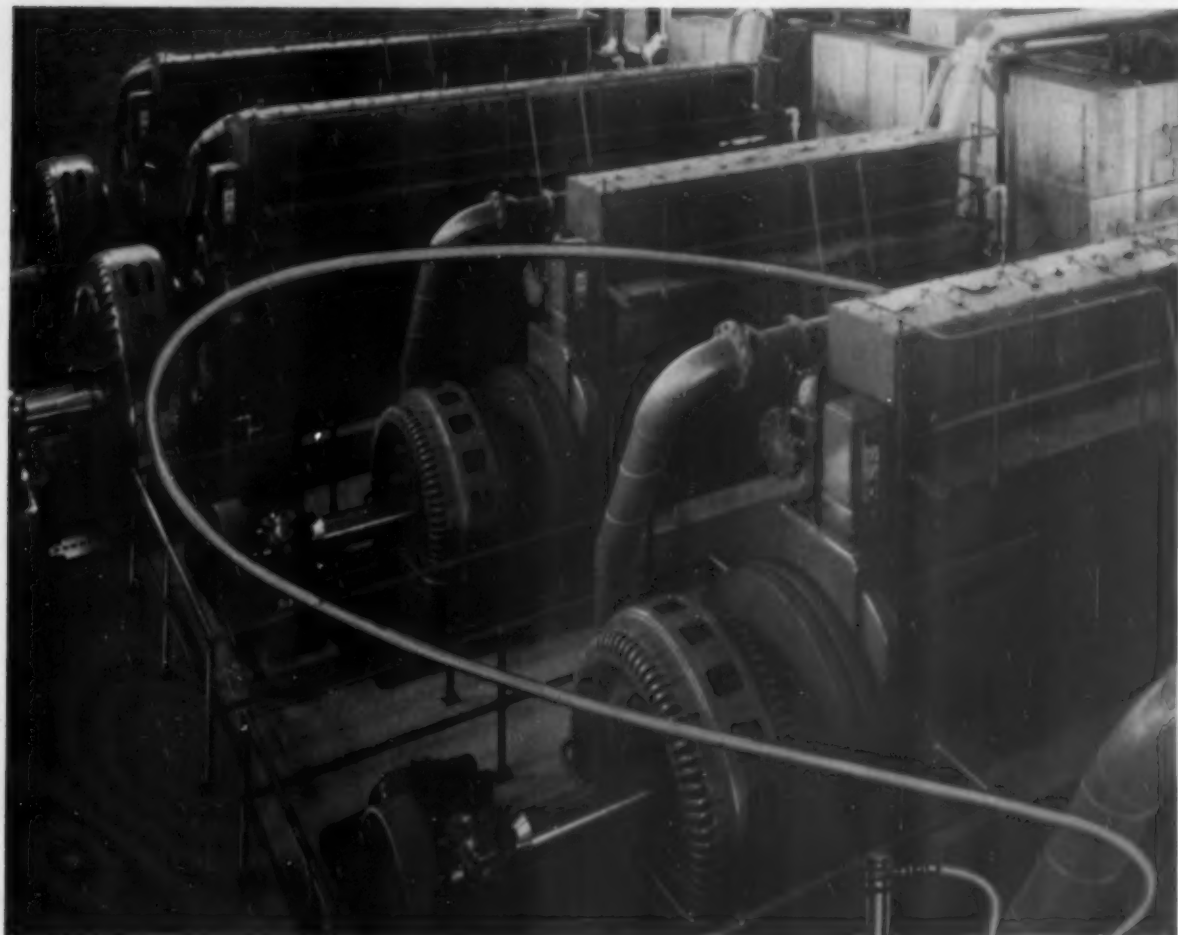
- **2,000 LEAKING JOINTS** in a huge 750 ton sheet and extrusion press recently confronted Convair maintenance engineers at Fort Worth, Texas. Hydraulic hammer caused leakage throughout the piping system. The pipes had been filled with oil, which had penetrated all the joints. To completely clean in place seemed impossible. To disassemble and replace would take three months and cost thousands of dollars.

Plant engineers decided to braze the joints with low temperature brazing alloy. Entire piping system was drained and then filled with Argon gas without any cleaning. No scale was formed, and the braze metal made a complete bond with both pipe and fitting. Some 1500-2000 joints were brazed, requiring 6 weeks time and 2400 man hours. Engineers conservatively estimate a 50% cost saving for the job as compared with the replacement of the piping system.

- **\$\$\$ FOR YOUR IDEAS**--Send your ideas, methods and short-cuts to SP&I. Payment is made for suitable material--a photo or rough sketch will make your idea more valuable. Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication. See the "Helping-the-Man-in-the-Plant" feature section in this issue.



# Log More Hours !



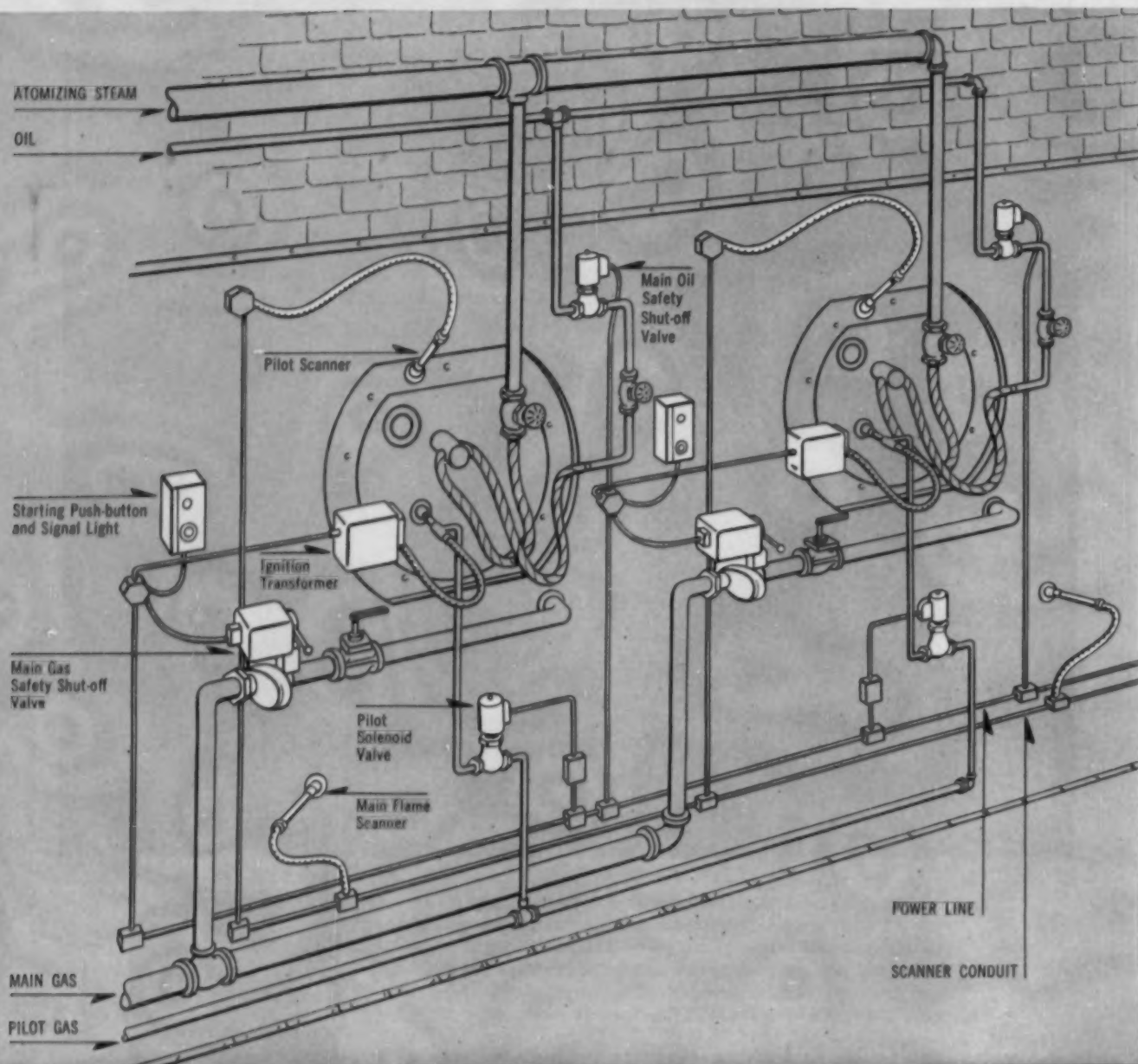
Log more hours . . . the *extra* hours of peak performance you get when you switch to Sinclair RUBILENE®. RUBILENE guards diesels against sticking rings and prevents excessive wear of moving parts operating continuously for long periods. You will find that RUBILENE lubrication pays off in lowered maintenance costs and your engines log more time between overhauls.

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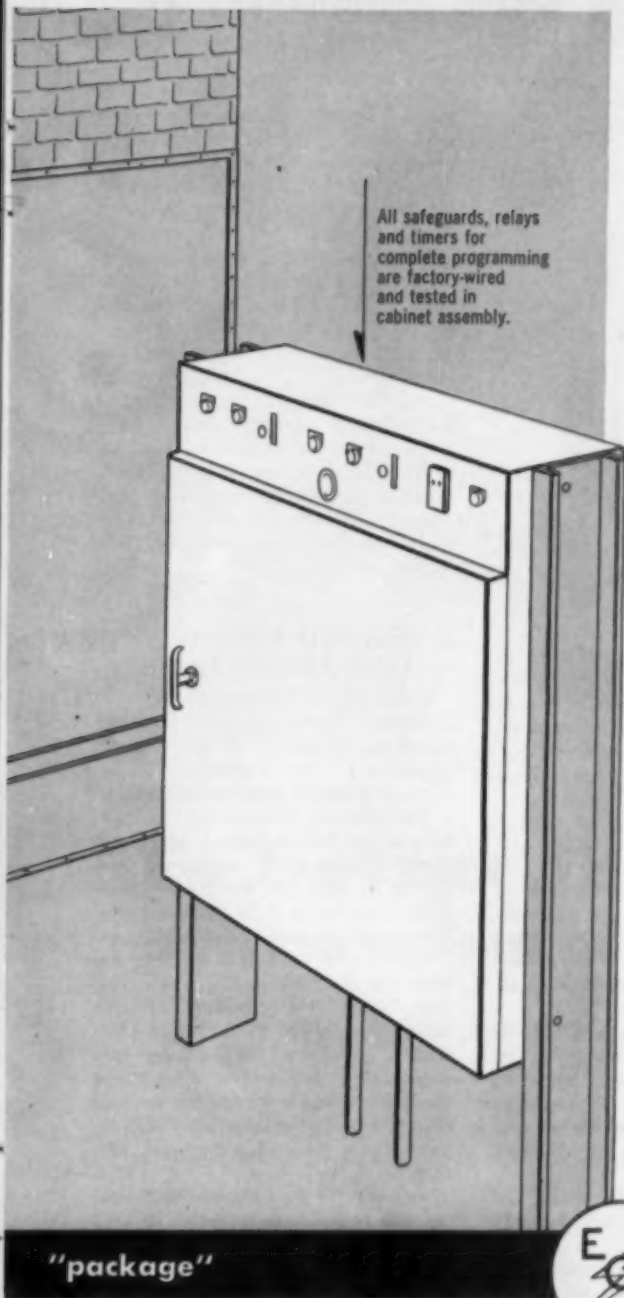


Insulating Tube



Electronic Scanner

# Operate Your Power Boiler



## New Fireye "Packaged" Interlock System automatically insures safe light-off and firing.

Now, for the first time, you can have a complete "packaged" safeguarding system for your power boiler. This single factory-integrated control system automatically, positively enforces a safe light-off procedure and supervises the flame during firing.

Every stage of lighting-off each burner is precisely controlled by Fireye's system of timers, interlocks, and shutoff valves. And, if the flame goes out, the system shuts off fuel in 2 to 4 seconds . . . and will not allow re-ignition before the combustion chamber is completely purged.

This new Fireye system eliminates the hazards of incorrect light-off and flame failure, which insurance records show are the cause of 85% of all furnace explosions. It can be installed on any multiple burner boiler. Installation supervision by a qualified Fireye engineer is part of our national service, when desired.

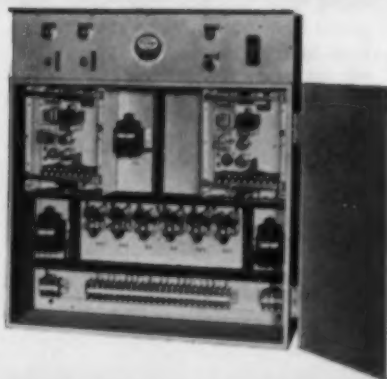
For full details, call your local Fireye representative, or use the coupon below.

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# NEWS for the South and Southwest

## Cuno Engineering Announces Southeastern Representatives

CONTROL EQUIPMENT COMPANY of ATLANTA, GEORGIA has been appointed exclusive sales representative by THE CUNO ENGINEERING CORPORATION to handle their line of industrial products which include Auto-Klean, Micro-Klean and Flo-Klean fluid and gas filters. The principals of this company, ROBERT P. SAUNDERS and CHARLES L. SAUNDERS, will cover Georgia, all of Florida except the northwest portion, eastern Tennessee and the two counties in South Carolina where the H-Bomb plant is located.

These men have extensive knowledge of and experience with sales engineering problems involving the process industries of this area. Both have been associated for years with such industrial companies as Robertshaw-Fulton Controls Co., Minneapolis-Honeywell, and Wheelco Instrument Company, and since 1952 have acted as sales representatives for similar types of equipment.

GEORGE S. EDWARDS of BIRMINGHAM, ALABAMA has also been ap-



Robert P. Saunders of Atlanta's Control Equipment Company.

pointed exclusive sales representative by Cuno Engineering to handle their line of industrial fluid and gas filters. The sales territory includes Alabama, parts of western Florida and central Tennessee. Mr. Edwards has extensive knowledge of and experience with sales engineering problems involving the process industries of this area.

facilities will permit production of other important chemicals in addition to the butyls, such as propyl aldehydes and derivatives, anyl aldehydes and derivatives, and decyl alcohols.

Provision also is being made at Texas Eastman for modification of some of the auxiliary equipment to permit rapid expansion of facilities manufacturing neopentyl glycol and trimethyl pentanediol, as demand warrants.

The new facilities at Longview are expected to be in operation by late fall of this year.

The first units of the Texas Eastman Company Oxo plant went into production in the spring of 1952. Utilizing propylene obtained by cracking East Texas liquefied petroleum gas, these units have been producing both n- and iso-butyraldehydes which are starting points for a number of important chemical products.

N-butyraldehyde itself is an important raw material in the manufacture of safety glass. Butyric acid, a derivative, is one of the starting

points for cellulose acetate butyrate for use in films, plastics and protective coatings. Through processing, n-butyraldehyde is converted to 2-ethyl hexanol, from which the most popular vinyl plasticizer, DOP, is produced.

Iso-butyraldehyde is used as starting point for the manufacture of pantothenic acid. Its derivatives also include isobutyl alcohol and isobutyl acetate, which find wide usage as solvents.

More recently Eastman has introduced several other chemical products based on iso-butyraldehyde, such as neopentyl glycol and trimethyl pentanediol previously mentioned, and current research indicates others as promising may soon reach the production stage.

## Atlantic Steel Distributor for Kaiser Aluminum Line

ATLANTIC STEEL COMPANY has been appointed distributor for aluminum warehouse products by the KAISER ALUMINUM AND CHEMICAL SALES, INC., of Oakland, California.

The Atlanta, Georgia firm will distribute the Kaiser line of aluminum sheets, plates, bars, rods, wire and tubing through its Warehouse Division, according to H. B. Johnson, company vice-president in charge of sales.

These new products will supplement the complete line of steel items now being sold through Atlantic Steel's Warehouse Division. In addition to aluminum, the company carries one of the south's largest and most diversified stocks of carbon and stainless steel, and has recently expanded its line of structural sections.

Atlantic Steel entered the steel warehouse business in 1947. In 1952 it constructed new warehouse facilities and an office building at a cost of more than \$600,000. An additional warehouse bay has just been completed and put into operation. This new bay, 540 ft long by 70 ft wide, has increased the division's warehouse space to over 100,000 sq ft.

M. C. SARRAN is manager of the company's Warehouse Division. FORREST E. SAUCIER, JR., who has had six years experience in handling aluminum products, has been added to the division's sales organization.

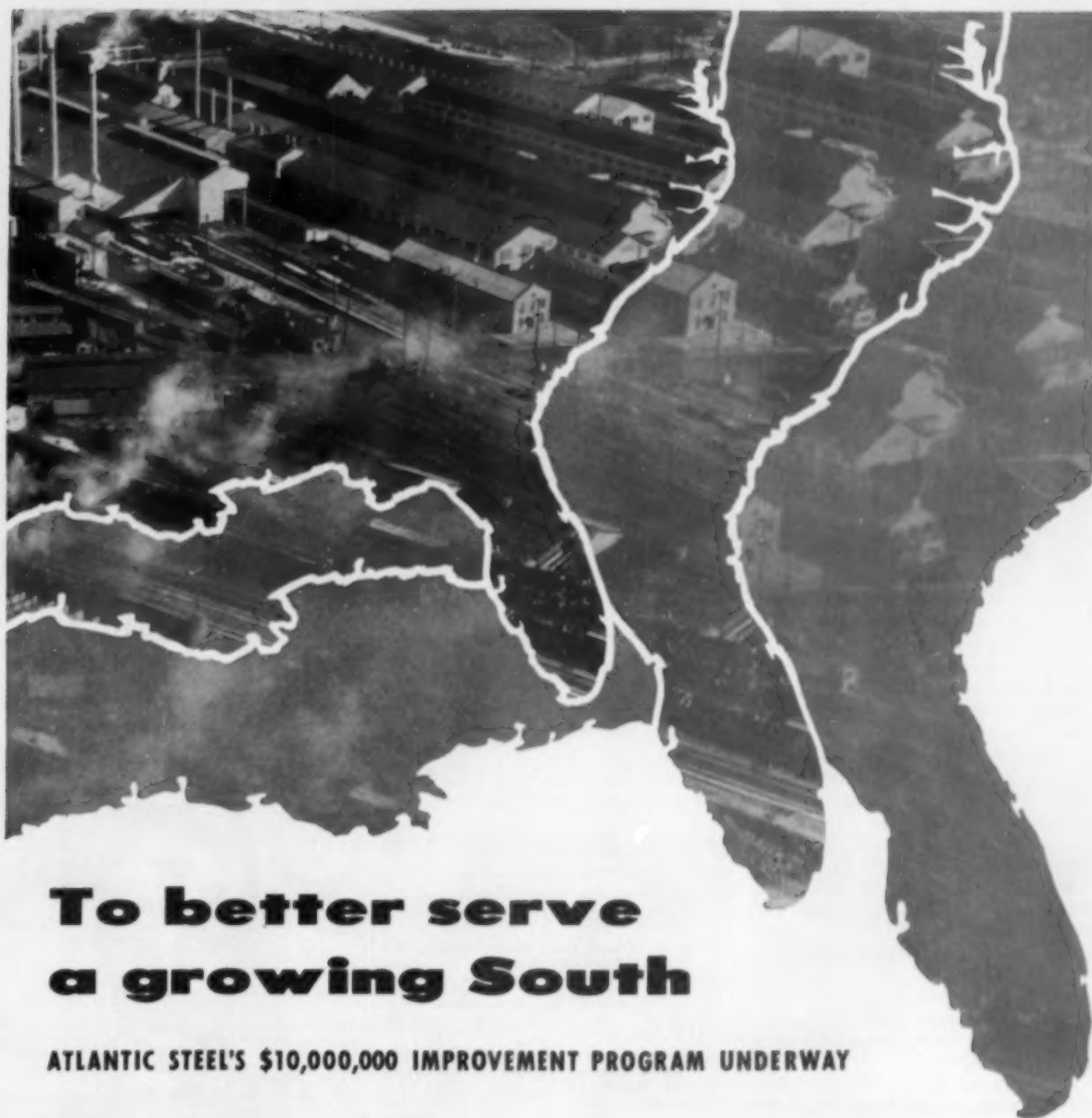
## Texas Eastman Expands Longview, Texas, Facilities

(SEE PHOTOGRAPH ON COVER)

Less than three years after new facilities were gotten underway in Texas Eastman must expand to meet increasing demand for "butyl family" products. Demand by users of products that depend upon the "butyl family," particularly in the field of plastics, already exceeds the original planned-for capacity of the new LONGVIEW, TEX., plant of TEXAS EASTMAN Co., division of Eastman Kodak Co. As a result, James C. White, president of Texas Eastman Company, announces that an expansion of the Oxo facilities at Longview has been approved and already is under way. The increase, it is expected, will provide adequate capacity for manufacture of butyl and derivatives, such as 2-ethyl hexanol, demand for which has outrun present capacity.

In discussing the new equipment planned for the Texas plant, Mr. White points out that the projected





## To better serve a growing South

### ATLANTIC STEEL'S \$10,000,000 IMPROVEMENT PROGRAM UNDERWAY

To better serve the growing South and its increasing number of industries, Atlantic Steel is modernizing and improving its facilities. Here are some of the steps in a \$10,000,000 improvement program:

- A new merchant bar and rod mill costing \$8,735,000 which will increase the range and productive capacity;
- A new 75-ton top charge electric furnace cost-

ing \$750,000 to supplement the first such unit and three open-hearth furnaces;

- A 50% increase in the space of the Warehouse Division to stock additional products, including large structurals.

With the completion of this program, new and additional industries in the South will be served by Atlantic Steel—one of the nation's completely independent steel producers.



# ATLANTIC STEEL COMPANY

P. O. Box 1714 • ATLANTA 1, GEORGIA

## News for the South and Southwest (continued)

### L. B. Foster Company Opens Atlanta Office

L. B. FOSTER COMPANY, a major supplier of pipe, steel sheet piling and railroad trackage materials, has recently established a new office in Atlanta, Georgia.



Paul Duke

In the southeast, the 52-year-old company is establishing substantial stocks of steel sheet piling, rail and track accessories, steel pipe of sizes ranging from 1/4 to 30-in., pipe fabrication facilities, special structural grade pipe, H-bearing pile, foundation pipe for piling, lightweight steel sheet piling and crane rail. Supplementary stocks also will be maintained at other points in the south and southeast.

The new office will be headed by PAUL A. DUKE, a graduate engineer from Georgia Tech formerly associated with Atlantic Steel Company. HAROLD FORD, also a graduate from Georgia Tech, will assist Mr. Duke in office and sales activities. Mr. Ford was previously associated with the Crane Co.

L. B. Foster Company's new office at 805 Peachtree St., N.E., Atlanta 5, Georgia will serve the states of Alabama, Florida, Georgia, North Carolina, South Carolina and Tennessee.

### Texas Vitrified Pipe Co. Enlarges Organization

The rapid growth of the TEXAS VITRIFIED PIPE COMPANY and its subsidiary, THE SOUTHWESTERN PLASTIC PIPE COMPANY, with headquarters in Mineral Wells, Texas, has forced the company to again expand its organization. Active management of the two companies is under the direction of J. F. BAILEY, Secretary and General Manager of the Texas Vitrified Pipe Company.

Since commencing business eight years ago the Texas Vitrified Pipe

Company has increased its capacity twice and is now engaged in the third program of additional construction. The Southwestern Plastic Pipe Company, which began business two years ago, has already expanded its facilities.

MR. R. L. BLESSING, formerly Plant Manager of Laclede-Christy Company's St. Louis, Mo. plant, has accepted a position as Production Manager of the Texas Vitrified Pipe Company. Mr. Blessing will be in general charge of the manufacturing division of Texas Vitrified Pipe Company assisted by George Kelm, General Superintendent, and Luther Waddy, Chief Engineer. David E. Clemens is General Sales Manager.

The Southwestern Plastic Pipe Company, which is a wholly owned

subsidiary of Texas Vitrified, is managed by E. W. Hendrick, General Manager, assisted by R. S. Perkins, Chief Engineer, and A. J. Brumbaugh, Sales Manager, under the general direction of Mr. Bailey.

### Big Investment at Escambia Bay—Florida

ESCAMBIA BAY, whose plant is under construction near PENSACOLA, FLORIDA, will produce ammonia and other nitrogenous materials for industrial and agricultural uses and ultimately also will produce materials for plastic based products.

Electric Bond and Share Company is a partner with United Gas and National Research in this enterprise. It has been estimated that by the end of 1955, Ebasco will have \$7 million invested in the Florida operation.

### Hammel-Dahl Co.—Carolinas

THE HAMMEL-DAHL COMPANY of Providence, R. I., manufacturers of automatic control equipment, has announced the appointment of the MAC-GUIRE INSTRUMENT COMPANY, 1200 Axtell Drive (Columbia), Cayce, South Carolina, as their new sales and service representative.



William MacGuire

This organization will offer the complete sales and service facilities of Hammel-Dahl engineering and products in South Carolina, North Carolina and part of Virginia.

WILLIAM J. MACGUIRE is in active charge of the company's sales and service. Following his graduation from the U. S. Naval Academy in 1944 and his active service in the Pacific theater until 1947, he has been engaged in actual field service for the Taylor Instrument Company and then, for the past five years, for the E. I. du Pont de Nemours in instrument consulting and design.

**More News—Page 96**

## FUTURE EVENTS Of Engineering Interest

**SOUTHEASTERN ELECTRIC EXCHANGE.** J. W. Talley, Mgr. Dir., 303 Haas-Howell Bldg., Atlanta 3, Ga.

Aug. 11-13, Personnel Administration Section, Roanoke Hotel, Roanoke, Va.

Sept. 23-25, Engineering & Operating Section, Charlotte Hotel, Charlotte, N. C.

Oct. 27-29, Sales Conference, Biltmore Hotel, Atlanta, Ga.

**AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.** H. M. Stewart, Chm. of Conference, P. O. Box 2827, Baytown, Texas.

Sept. 13-14, Electrical Conference of the Petroleum Industry, Shamrock Hotel, Houston, Texas.

**PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIA.** Robert W. McKinnon, Exec. Sec'y, 5 Franklin Road, Roanoke, Va.

Sept. 15-18, 37th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

**AMERICAN SOCIETY OF LUBRICATION ENGINEERS and AMERICAN SOCIETY OF MECHANICAL ENGINEERS.** Lubrication Activity Group, E. M. Phillips, Sec'y, 6 Westminster Road, Marblehead, Mass.

Oct. 10-13, Second Lubrication Conference, Antlers Hotel, Indianapolis, Ind.

**AMERICAN SOCIETY FOR METALS.** William H. Eisenman, Sec'y, 7301 Euclid Ave., Cleveland 2, Ohio.

Oct. 17-21, National Metal Exposition and Congress, Commercial Museum and Convention Hall, Philadelphia, Pa.

**NATIONAL ASSOCIATION OF CORROSION ENGINEERS.** A. B. Campbell, Sec'y, 1041 M & M Bldg., Houston 2, Texas.

Oct. 18-21, South Central Region Meeting, Houston Hilton-Shamrock Hotel, Houston, Texas.

**AMERICAN SOCIETY OF MECHANICAL ENGINEERS.** E. K. Stevens, Mgr. International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Nov. 14-18, Chicago Exposition of Power & Mechanical Engineering, Chicago Coliseum, Chicago, Ill.

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Nominal Thickness, inches						
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2	1	1½	2	2½	3	3
2½	1	1½	2	2½	3	3½
3	1	1½	2	3	3	3½
3½	1	1½	2	3	3½	3½
4	1	1½	2½	3	3½	4
4½	1½	2	2½	3	3½	4
5	1½	2	2½	3	3½	4
6	1½	2	2½	3½	4	4½
7	1½	2	3	3½	4	4½
8	1½	2	3	3½	4	4½
9	1½	2	3	3½	4½	5
10	1½	2½	3	4	4½	5
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Also available in iron and steel

No. 11 — For Steam



NO. 227 — FOR WATER

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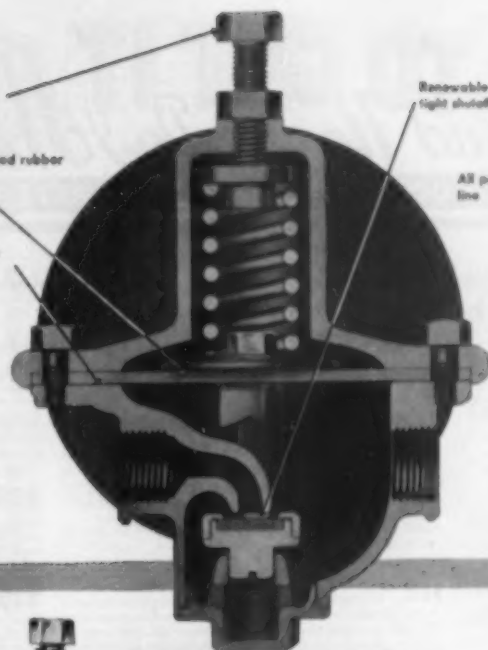
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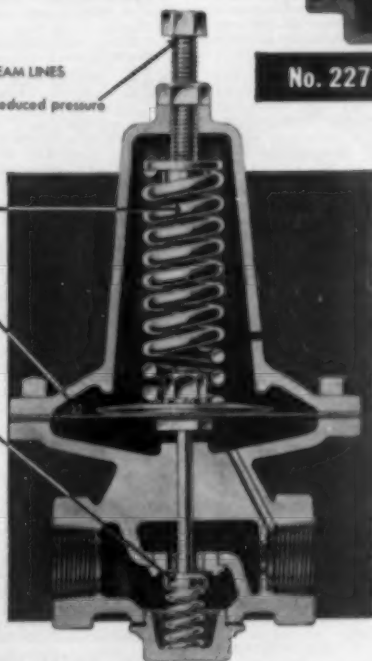
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No. 227 — For Water

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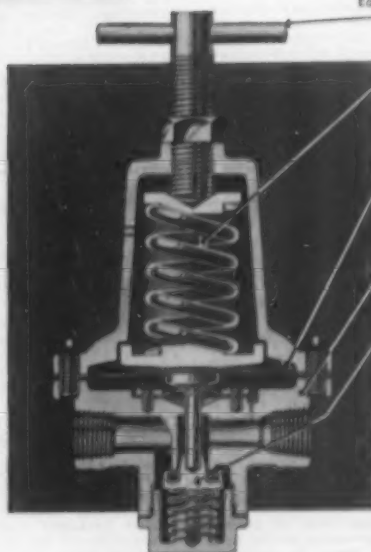
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**861 FUSKRON FUSES**—Booklet—Gives complete facts on Fuskron dual-element fuses, a combination fuse and thermal cut-out of low electrical resistance and high time lag—prevents shut-downs, saves maintenance costs.—**HUSMANN MFG. CO.**

#### MISCELLANEOUS . . . SAFETY, BUILDING EQUIPMENT, METALS

**902 BUILT-UP ROOFING**—Bulletin 5591, 16 pages—General requirements on built-up roofing specifications including instructions for over wood, precast or poured gypsum; spray pond roofs; concrete, precast concrete slab; information on fire-resistant vapor barrier flashing details; etc.—**THE PHILIP CAREY MFG. CO.**

**904 STEEL GRATING AND STAIR TREADS**—12 page catalog—Shows "Weldforged" steel construction and application—spiral crossbars, alternating right and left and slightly above bearing bars electrically welded into one unit to insure greater non-skid protection and durability.—**KERRIGAN IRON WORKS, INC.**

**924 BLEACHES**—Catalog 13-1-1—Describes "Weldforged" steel bleachers to give inexpensive, permanent, easily erected units. Illustrates simple, fast and inexpensive erection, particularly applicable to plant recreation bldgs.—**KERRIGAN IRON WORKS, INC.**

**935 METAL STAMPING FACILITIES**—Brochure No. 100—Describes shearing, blanking, drawing, forming, embossing, assembly and finishing equipment in Campeco's modern Carolina plant which offers Southern industry convenient, modern facilities for metal stamping. Plant has 67 major units of equipment, including a 300 ton hydraulic press. From design through delivery, Campeco converts your production ideas into finished metal products.—**CAROLINA METAL PRODUCTS, INC.**

Continued on page 108

Please send me without obligation, free booklets described in the August, 1955, issue of SOUTHERN POWER AND INDUSTRY as circled below.

26	28	29	30	38	43	48	56	76	99	103	110	112	118	119	131	160
167	196	202	208	210	222	223	231	237	257	287	307	312	340	345	356	357
366	388	403	410	412	426	454	469	483	496	501	511	513	518	526	534	564
575	611	610	631	636	637	653	693	694	708	728	772	778	821	840	854	861
902	904	924	935	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	S-12	S-13
S-14	S-15	S-16	S-17	S-18	S-19	S-20	S-21	S-22	S-23	S-24	S-25					

Also send further information on following New Equipment (page 88)

H-1 H-2 H-3 H-4 H-5 H-6 H-7 H-8 H-9 H-10 H-11 H-12 H-13 H-14 H-15 H-16 H-17 H-18

Name ..... Position .....

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City ..... Zone ..... State .....



#### BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 582, SEC. 34.9, P. L. & R., ATLANTA, GA.

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SOUTHERN POWER AND INDUSTRY  
806 Peachtree St., N. E.  
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List Items You Want,  
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Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.



**360° hoist hook service...**



**WITH -**

**AMERICAN  
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**PEDESTAL JIB**

Here's the answer to economical local handling service to process machines, particularly beneath heavy mill type cranes... it's the American MonoRail Pedestal Jib.

These jibs are recommended for capacities between 500 to 4,000

pounds, headroom 9 and 12 feet, and

boom length 8 and 12 feet... a truly

precision built, skillfully engineered job.

Turn to American MonoRail for any overhead handling requirements. Your American MonoRail

engineers will be glad to consult with you.



**AMERICAN**

OVERHEAD  
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EQUIPMENT

**MonoRail** COMPANY

13105 ATHENS AVENUE • CLEVELAND 7, OHIO

[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]

Write for Bulletin PJ-1  
For Continuous Flow of Light Loads  
Use Landahl Chainless Conveyors

# **"WE CUT MOTOR REPAIRS FOR ONE OF OUR CUSTOMERS FROM 18 MOTORS PER YEAR TO 2 BY INSTALLING FUSETRON FUSES"**

"The owner of a large poultry farm is one of our customers. In his operation a great number of motors are used in many different ways — pumps, feed grinders, heating systems, ventilators, etc.

"But these motors were giving him so much trouble that we were rewinding from 12 to 24 burned out motors a year for him.

"To correct the trouble, we suggested protecting the motors with Fusetron dual-element fuses. He told us to go ahead and try them. So, after checking the circuits and motors, Fusetron fuses were installed in proper sizes.

"Fusetron dual-element fuses proved themselves from the beginning. For the entire year following their application, only 2 motors were repaired and this trouble was caused by over lubrication.

"The motors we rewind are guaranteed for a year so we want to be sure they are properly protected. That's why we recommend to all our customers that they use Fusetron dual-element fuses."

*Lawson E. Cobb*

President

NEW ENGLAND ELECTRIC  
MOTOR EXCHANGE INC.  
GARDNER, MASS.

FUSETRON is a  
trademark of  
Bussmann Mfg.  
Co.



*Harlan  
F. Cobb*

Vice President



ROBERT E. HENRIKSON  
Shop Foreman



## FUSETRON dual-element FUSES do more than cut your motor repair costs

### Fusetron fuses save you recalibration and maintenance costs

Fusetron fuses are calibrated at the factory by engineers. Once properly installed, they require no periodic inspection or down-time necessary on mechanically operated devices.

### Fusetron fuses eliminate down-periods caused by needless blows

Fusetron fuses can increase production and reduce annoying interruptions of regular maintenance because — they wipe out needless blows caused by harmless overloads or excessive heating.

### Fusetron fuses increase life of equipment

If there is an electrical fault, Fusetron fuses open and warn of danger and help hold fault to its source.

Panels and switches are protected against damage due to poor contact heating.

### 100,000 amp., interrupting rating gives you maximum safety

Fusetron fuses can safely interrupt the most severe available short circuit current — and are adequately safe to meet future circuit growth.

### Fusetron fuses save on installation costs

They protect against waste of space and money by permitting use of proper size panels and switches, instead of oversize.

## Here's why Fusetron fuses give all-purpose protection

A fuse link combined with a thermal cutout — the result, a fuse with tremendous time-lag and much less electrical resistance and an interrupting rating in excess of 100,000 amps.

They have the same degree of Underwriters' Laboratories approval for both motor-running and circuit protection as the most expensive devices made.

Made to same dimensions as ordinary fuses. FUSETRON Fuses fit all standard fuse holders.

Obtainable in all sizes from 1/10 to 600 ampere, both 250 and 600 volt types. Also in plug types for 125 volt circuits.

Their cost is surprisingly low.

Write for bulletin FIS.

### For loads above 600 and up to 5,000 amps., Use BUSS Hi-Cap Fuses . . .

They have unlimited interrupting capacity to handle any fault current regardless of system growth.

They can be coordinated with Fusetron fuses on feeder and branch circuits to limit fault outages to circuit of origin.

Write for bulletin HCS.



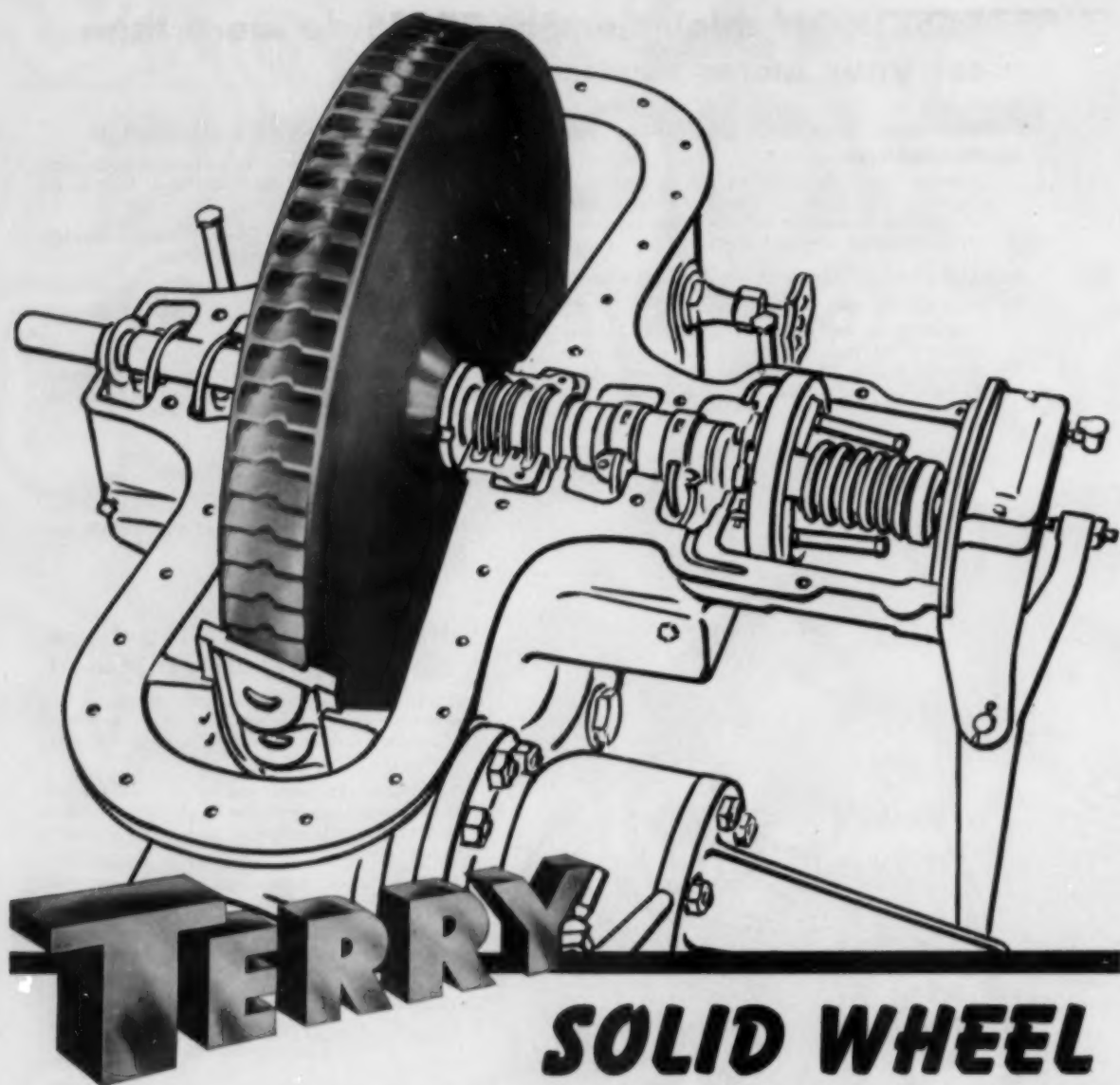
BUSSMANN MFG. CO. Div. of McGraw Electric Co.  
University at Jefferson, St. Louis 7, Mo.



Lawson E. Cobb  
President

**Play Safe! install FUSETRON dual-element Fuses and  
BUSS Hi-Cap Fuses throughout entire Electrical System!**





## **SOLID WHEEL RUGGEDNESS** is your turbine dividend

The rugged construction and fool-proof design of a Terry solid-wheel turbine can save you money by keeping maintenance costs to a minimum. Usually only taken down for routine inspection, any repairs that must be made are of relatively simple nature, and cost of replacement parts is small.

The rotor of the turbine is a single forging of special composition steel, in which a series of semi-circular buckets is milled. There are no separate parts to loosen or work out. As the only function of the blades is to form a series of pockets, any wear which might occur would not materially affect

horsepower or efficiency.

It is impossible for the blades to foul. They have large clearances and are further protected by the projecting rims of the sides of the wheel. As the side clearances are also very large, end play can do no harm.

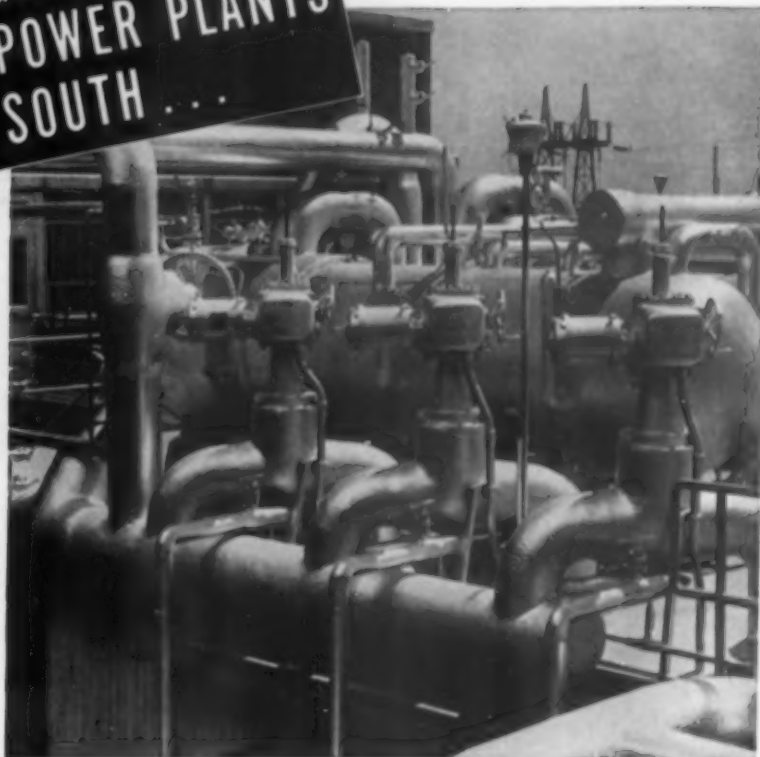
The Terry solid-wheel turbine is an extremely reliable piece of equipment—why not write for complete details today? Ask for a copy of Bulletin S-116.

**THE TERRY STEAM TURBINE COMPANY**  
TERRY SQUARE, HARTFORD 1, CONN.

TT-1198



One of the **LARGEST** and  
**MOST MODERN POWER PLANTS**  
in the **MIDDLE SOUTH** . . .



**has  
installed**

## *LimiTorque*® **VALVE CONTROLS** **on High Pressure STEAM LINES**

Added to the long list of leading Central Stations and Private Power Plants which use "LimiTorque" Motorized Valve Operators, is the modern, new Delta Steam Plant of the Mississippi Power & Light Company located at Cleveland, Mississippi. This 200,000 kilowatt plant has installed many Walworth Valves with "LimiTorque" Operators on high pressure steam lines.

LimiTorque Remote Control permits one man to operate and know the status of each valve at a central push-button control station. This is an important safety factor, as men are not required to go to high, low or dangerous locations for manual operation. Further, LimiTorque automatically shuts off power should an obstruction occur in closing, thus protecting the valve parts. LimiTorque is always operative electrically, yet operating personnel are always positively safe, as the handwheel is automatically disengaged when the valve is motor operated.

LimiTorque operated valves are always seated tightly, because the seating thrust of valve disc is accurately maintained in each closing cycle through the patented torque limiting mechanism.

LimiTorque is available for all makes and types of valves, and is adaptable to existing equipment. Actuation can be by any available power source . . . electricity, water, gas, oil or air.



Send for complete  
Catalog L-34.

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Industrial Gears & Speed Reducers

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Established 1897

### **SERVING SOUTHERN INDUSTRY from LYNCHBURG, VA.**

For catalogs or detailed information, write Virginia Gear and Machinery Corp., Lynchburg, Va. or the address above.

## Picture of a Natural Gas Burner Maintenance Crew



**N**o . . . the printer didn't forget to put in the picture. This is just our way of dramatizing the fact that natural gas burners require virtually NO maintenance.


They don't present a big replacement problem either. Many industrial natural gas burners have been doing an efficient job for a quarter century.

Nor do natural gas users have to worry with complicated processing machinery to handle the fuel and prepare it for use. Natural gas comes ready to go to work.

So . . . if maintenance and replacement costs have been red-inking your budget, there may be a money saving thought here for you.

**SOUTHERN NATURAL GAS**  
**COMPANY**  
*Serving the Growing South*

WATTS BUILDING • BIRMINGHAM, ALA.



West Penn Power Company selected Gulfcrest Oil to lubricate this 140,000 kilowatt unit on the basis of its outstanding performance in the other turbines at their Springdale, Pennsylvania Plant.

**—they looked  
at the record  
and **again** selected**

# GULFCREST OIL

When the West Penn Power Company looked at the record of Gulfcrest Oil in its seven turbine units at Springdale, the choice of lubricant for Number Eight was no problem—Gulfcrest again!

Here's what the record showed: In each of the seven units the original fill of Gulfcrest had been in service for years without any significant changes in its characteristics. And of course the turbines operated continuously and dependably during this period.

A record like this did not just happen. It is the result of careful selection of crude oils that are

thoroughly refined, then super-refined by Gulf's exclusive Alchlor Process, which removes the unstable hydrocarbons that remain after normal refining. This discarded portion, if allowed to remain in a turbine oil, accelerates oxidation, increases neutralization number, forms sludge, and harmful acids.

So to insure safe, long-lasting protection for your turbines, specify Gulfcrest—the world's finest turbine oil. Contact your nearest Gulf office today and have a Gulf Sales Engineer recommend the proper grade.



THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

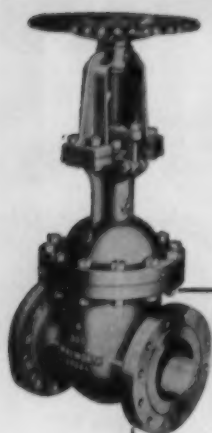
GULF OIL CORPORATION • GULF REFINING COMPANY  
1822 GULF BUILDING, PITTSBURGH 30, PA.

**WALWORTH**

# Cast Steel Gate Valves

*Series 150 and 300*

*Wedge Gate — Outside Screw and Yoke*



Sectional view of Series 300

**Big 8-Point Superiority!**

**Gland** clearances are such that stem cannot be scored if gland should be tightened unevenly.

**Deep Stuffing Boxes** in all sizes (2" to 24") insure tightness and maximum packing life — costly leaks are eliminated.

**Bonnets and Bodies** are engineered to withstand pressure and minimize distortion — they're tough, durable, dependable.

**Heavy Steel Walls** provide extra strength and longer life.

**Integral Body Guide Rib Faces** are machined to insure accurate disc seating.

**Seat Rings** are bottom seated — not flange type. No recess exists at back of ring — hence no turbulence, erosion, or pressure drop.

**Streamlined Ports** allow high velocity, non-turbulent flow, and reduce the possibility of erosion.

**Valves** regularly have flanged ends. They can be supplied with ends for butt welding. Roller bearing yokes are available. On valves 5 inches and larger, by-passes can be furnished.

*For Series 600 and higher, we recommend Walworth Pressure-Seal Steel Gate Valves.*

For further information on Walworth Cast Steel Gate Valves, see your local Walworth distributor, or write:

**WALWORTH**  
**valves and fittings**

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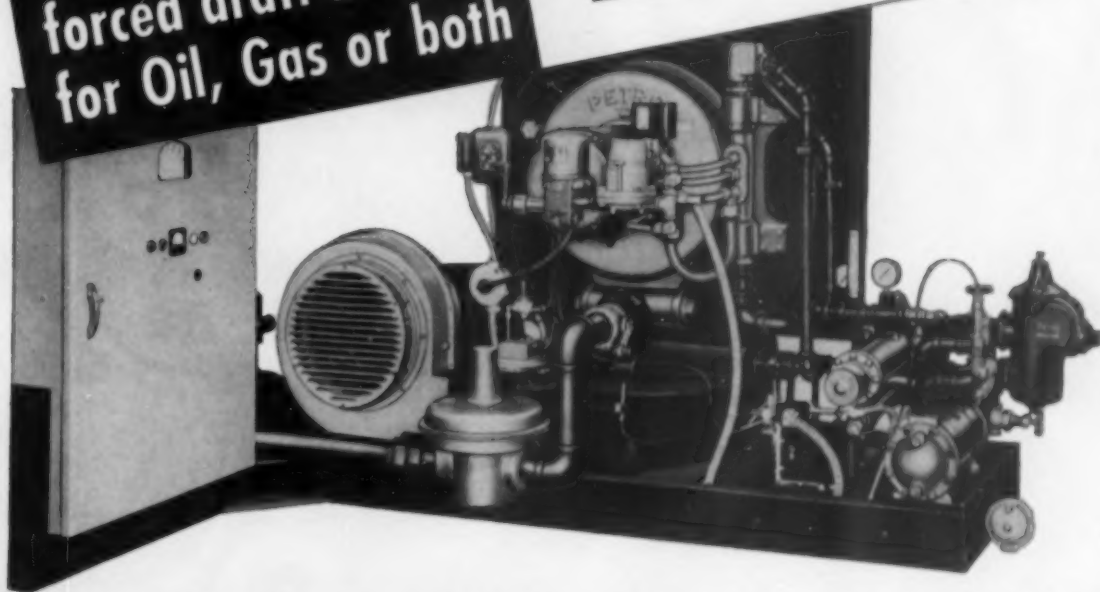
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



# HERE'S **BOILER ROOM ECONOMY** *from the word "GO"*

**Petro**  
forced draft burners  
for Oil, Gas or both

**A COMPLETE FIRING  
SYSTEM IN A  
SINGLE PACKAGE**



## **Quickly converts your present boiler to automatic firing**

### **LOW FIRST COST**

This Petro package unit is much more than a conversion burner. It is a *complete* combustion system in which all elements are correctly balanced—and integrated—a thoroughly engineered firing plant.

Includes burner (for oil, gas or combination oil-gas), fuel system, forced draft air supply, control panel, and preformed refractory combustion throat. Installation requires little more than bolting the entire unit to the boiler-front, and making safety and service connections for power and fuel.

### **ENCLOSED CONTROL PANEL**

Neat, safe, and complete—the Petro control panel is totally enclosed with all instruments wired and tested at the factory. Can be attached to frame as shown, turned 90° or 180° or mounted elsewhere in the boiler room.

### **LOW FUEL COST**

**OIL**—Petro's highly efficient horizontal rotary oil burner is adaptable to the entire range of fuel oil grades. Exclusive Petro Thermal Viscosity System automatically heats the heavier oils before injecting into atomizing cup. Assures quick pickup with sure and economical firing of lower cost fuels.

**GAS**—Designed for all types of gas—high or low pressure—the Petro circular arrangement of multiple gas jets provides a thorough mixing of gas and air *ahead* of the combustion zone. A real fuel saver. Adaptable to steady or fluctuating load requirements.

**COMBINATION OIL-GAS**—In one compact unit. Gives alternate stand-by fuel and permits taking advantage of fuel price fluctuations. Fuels can be switched in a matter of seconds.

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automatic  
heating and  
power equipment



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# you've got to be good to stay in front

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*The combined facilities for research, testing and engineering behind Standard Oil Lubricants are unequalled.*

**Standard Oil Company**  
(KENTUCKY)

# Reichhold Chemicals, Inc. *Saves Money with QC BOILER!*



REICHOLD CHEMICALS, INC. Charlotte, N. C.

## Cost of produced steam reduced by 15 to 20%!

The installation of a 10,000 lbs/steam/hr Queen City "bent tube" water tube boiler is a real money-saver for Reichhold.

Cost of steam is reduced 15 to 20% which represents a saving of hundreds of dollars monthly. These savings, **plus** the continuous steam pressure maintained by the QC boiler under rapid and extreme fluctuating loads guarantees economical plant operation.

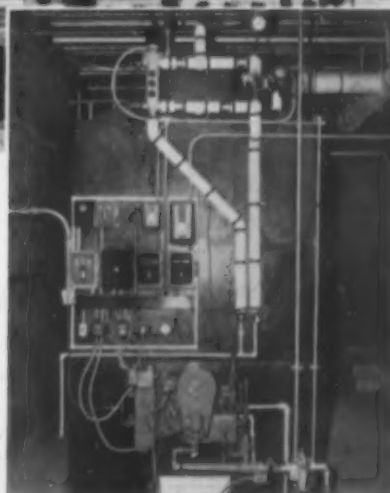
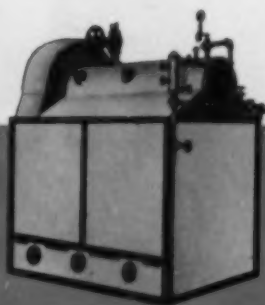


Photo shows front panel of boiler installation.

The Reichhold installation is combination gas and oil fired, with a **30-second push-button changeover!** Coal, gas, oil or combination gas/oil firing units from 300 to 15,000 lbs/steam/hr, up to 250 psi.

For more steam, faster and drier, at less cost, install a QC water tube boiler in your plant.



For complete information, write

**Queen City  
Engineering Co.**

P. O. BOX 3193, CHARLOTTE, NORTH CAROLINA

# How Union Electric met the cry for MORE KVA...ECONOMICALLY

Faced with today's universal problem of growing secondary loads, Union Electric Co. of Missouri found a swift economical answer in the new General Electric standard 167-kva transformers.

In one area near Festus, Missouri, Union Electric needed to increase kva capacity and at the same time change distribution voltage from 2400/4160 wye to 7200/12470 wye. It was desirable, however, to use existing poles and to maintain existing clearances. Lightweight, low-height units were obviously required.

The company did the job quickly and economically by installing the new G-E standard 167-kva transformers. The average time for mounting from ground to crossarm was less than five

minutes. No special riggings were necessary and no platforms had to be built.

The new 167-kva transformer is another result of G-E research in a continuous program to reduce transformer weight and height. Today the 167-kva unit is *670 pounds lighter and 14" lower than before*. It is now in the pole-type class and is available as a standard unit.

Thanks to G-E engineering developments you can now hang distribution transformers of higher kva ratings without replacing poles and without building costly platforms. Let G.E. help solve your load growth problems. Simply call your nearest G-E Apparatus Sales Office. General Electric Co., Schenectady 5, New York. 431-34

*Progress Is Our Most Important Product*

GENERAL  ELECTRIC



OLD 167-KVA UNIT VS. NEW STANDARD 167-KVA UNIT

OLD		NEW
2170 lbs.	Weight	1500 lbs.
67 1/4"	Height	54"
740 Watts	Core Loss	530 Watts
1.25% at 1.0 p-f	Regulation	1.25% at 1.0 p-f
3.5% at 0.8 p-f		2.9% at 0.8 p-f

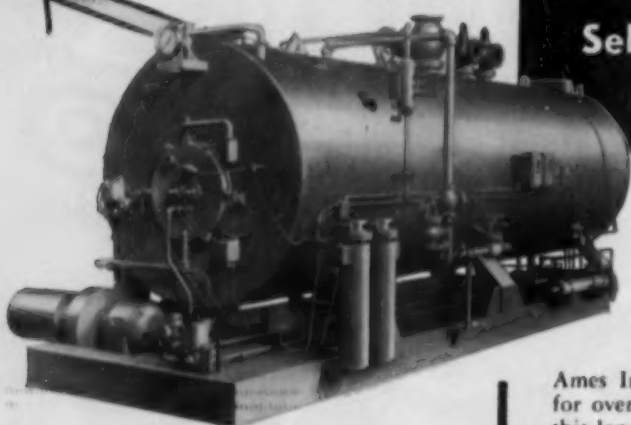




**NEW**  
G-E standard  
167-kva unit goes  
from ground  
to crossarm  
in 5 minutes



# SO YOU HAVE TO BUY A **BOILER!**



Select an **AMESTEAM** GENERATOR  
and solve all your problems

You don't have to dig through mountains of data to pick the boiler that will give your company the most economical and satisfactory service! It's more a question of *where* you buy it than what boiler you choose. What's the maker's reputation?

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- Package installation economy.
- Completely safeguarded.
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- 20 sizes, 10 to 600 H.P., 15 to 200# W.P., oil, gas or oil-gas combinations with quick fuel switchover feature.

Ames Iron Works have been building boilers of quality for over 100 years. Back of every Amesteam Generator is this long, successful experience — represented by the Ames Engineering Staff, a large group of skilled boiler makers and an efficient, nation-wide sales and service organization at your disposal. Yes, quality and experience *do* count — and the thousands of Amesteam Generators giving dependable, low-cost service in power, process and heating applications are proof of it. Why not be *sure* by specifying Amesteam Generator? Write today for details and name of your Ames representative.

**AMES IRON WORKS, INC.**

BOX 1-85,

OSWEGO, N. Y.

Modernization doesn't necessarily mean large capital outlay . . . in this plant it cost only \$205,900—and it will be repaid by savings in just four years!

**MOTOR  
PRODUCTS  
CORPORATION**



## **Burning coal the modern way saves Motor Products \$54,000 a year**

Faced with poor boiler control, air pollution difficulties, inefficient coal and ash handling and other costly defects in its outmoded power system, Motor Products Corp., Detroit, called in local consultants to make a study. The engineers recommended a modernization program, involving some new equipment along with the adaption of existing units to new systems.

This modernization is saving Motor Products time, labor, and money—better than \$54,000 per year. Now the entire operation is clean and efficient. Production of economical steam is faster, simpler, more reliable and well within the bounds of smoke and dust regulations.

### **Investigate Your Fuel Costs**

If you're planning to modernize your plant or build a new one—or if you are just interested in cutting fuel costs—find out how coal, burned the modern way, compares to other fuels. Why not talk to a consulting engineer or

your nearest coal distributor? Their advice may save you thousands of dollars each year.

### *facts* you should know about coal

Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar.

Automatic coal and ash handling systems can result in a virtually labor-free plant.

Coal is the safest fuel to store and use. No dust or smoke problems when coal is burned with modern equipment.

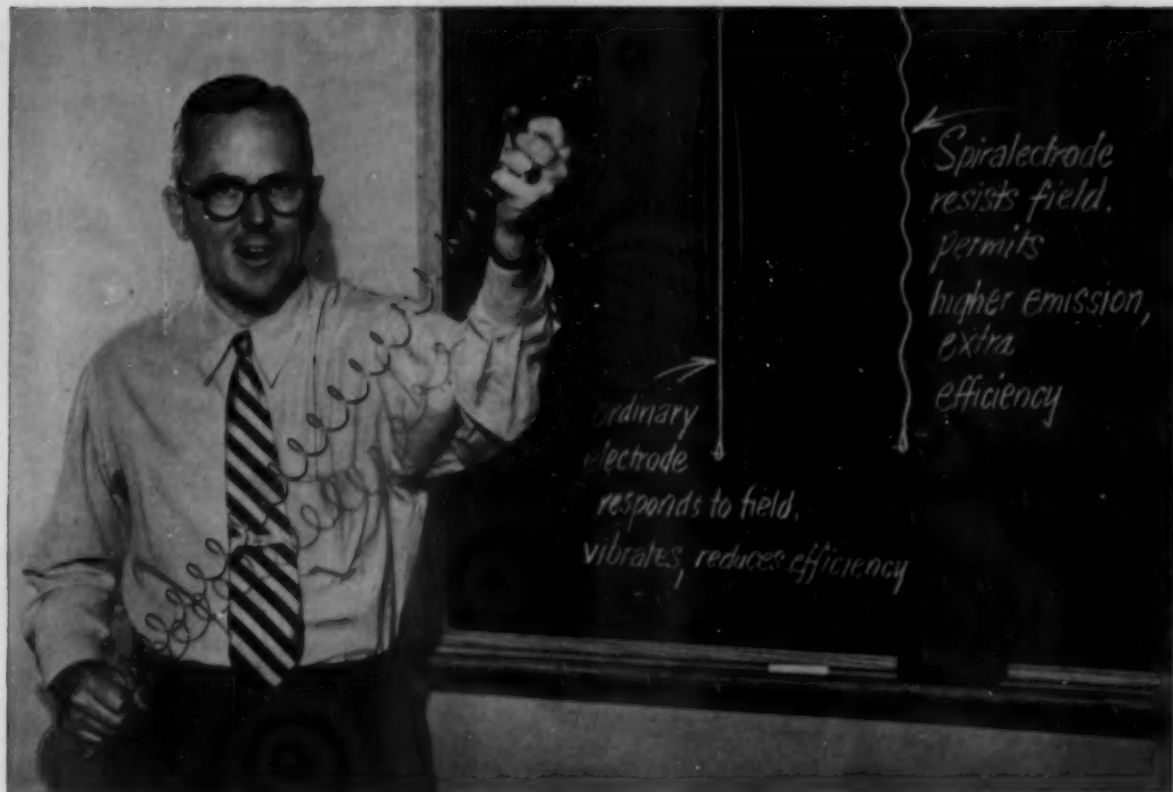
In most industrial areas, bituminous coal is the lowest-cost fuel available.

Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

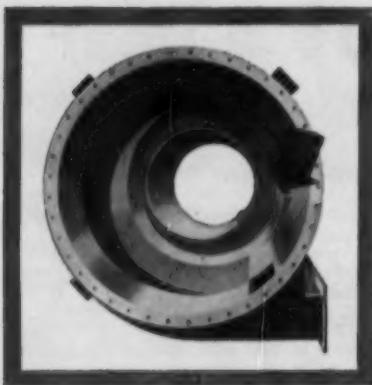
**NATIONAL COAL ASSOCIATION**  
Southern Building, Washington 5, D.C.

# How Buell's Unique Spiralectrodes deliver EXTRA DUST COLLECTION EFFICIENCY!

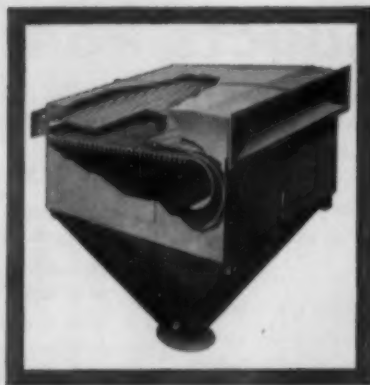


Coupled with the unique spiralectrode feature is Buell's Continuous Cycle Rapping—the most effective mechanism yet developed for dry dust

precipitation. Completely eliminates puffing, keeps electrodes constantly clean. Re-entrained dust is minimized, peak efficiency is maintained.



Buell Cyclones also deliver extra efficiency, due to exclusive shave-off which harnesses double-eddy and puts it to work!



Buell's Low Resistance Fly Ash Collector combines top efficiency with low draft loss, for natural or forced draft installations.



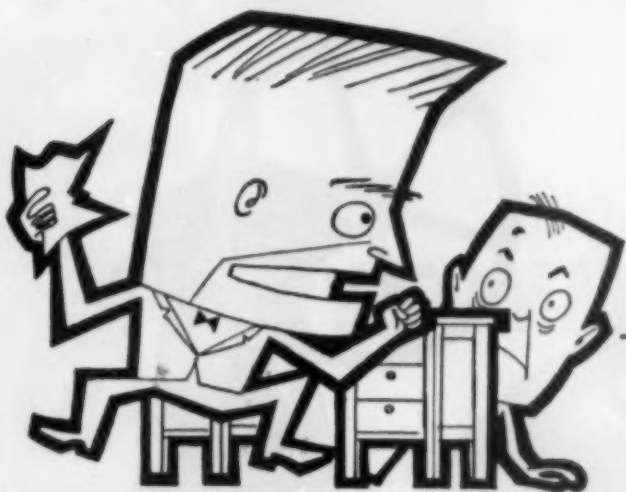
For the complete story behind Buell's extra efficiency, write Dept. H-80, Buell Engineering Company, 70 Pine Street, New York 5, N. Y.

# buell



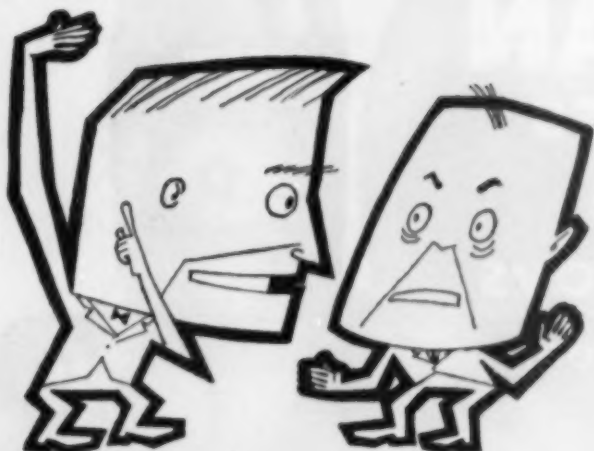
Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**





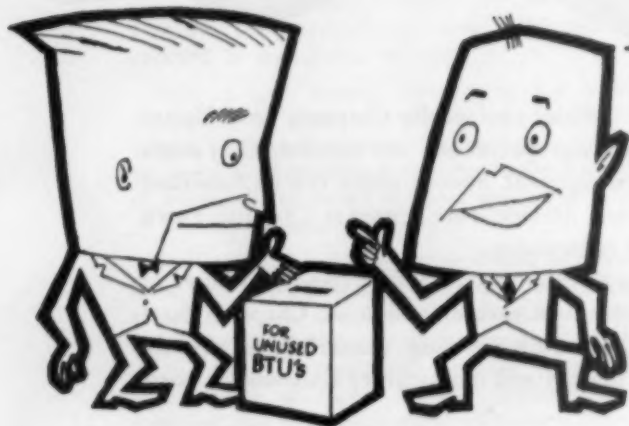
Fire the fireman!  
Here's another  
smoke summons.

Don't fire the fireman, he's doing his best.  
Let us look for a more adaptable coal.



What's wrong with the  
coal? It's high in BTU's.

Sure, it's a good coal—in the right furnace—  
but our set-up just can't supply enough air to  
burn all of the hydrocarbons before they cool  
off and blow up the chimney as free carbon.



There's no sense in  
buying BTU's we  
can't burn, is there?

You've got a point there—and one that so  
many people are never aware of. It isn't only  
what's in the coal that counts—it's what you  
can get out of it under your own set of condi-  
tions. That's why picking the right coal is a job  
for a competent combustion engineer. The  
superior quality coal produced at mines served  
by the Chesapeake and Ohio will meet our most  
exacting requirements. Before we sign another  
coal contract, let's get in touch with coal pro-  
ducers on the C&O or a C&O coal man to give  
us the facts and figures on which coal will cost  
us least in the long run.



There's a lot more to buying coal  
than the cost per ton. For facts and fig-  
ures to solve your particular fuel re-  
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General Coal Traffic Manager, Ches-  
apeake & Ohio Railway Company, Ter-  
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in any of the  
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# TIMELY COMMENTS



## Hoover Commission Can Save Money for You

**T**HE OLD saying that nothing is so certain as death and taxes is indicative of the feeling of futility and frustration that confronts the average citizen when he hears of the constantly mounting cost of government. The astronomical figures involved, and the general tendency on the part of bureaucrats to endeavor constantly to expand their operations and budgets, leave most citizens with a feeling of helplessness insofar as a remedy for the situation is concerned.

Recent experience, however, shows that something can be done to increase efficiency in government and reduce the mounting cost of government. The Hoover Commission which functioned in the early postwar years, studied the reorganization of government departments carefully and offered 175 recommendations for increased efficiency and economies. Of these, some three-fourths were adopted and have already resulted in substantial savings.

Now, a new Hoover Commission has been studying the organization of the Executive branch of the government. Thirteen task forces set up by the Commission have conducted studies to determine the causes of waste and inefficiency in the federal establishment.

The personnel of these task forces includes some 200 experienced business and industrial executives—men who have been outstandingly successful in establishing efficiency and economy in their own organizations. Among them are such leaders as *Harry Erlicher*, former vice-president and purchasing agent of General Electric; *Charles R. Hook*, chairman of Armco Steel; *Thomas D. Jolly*, vice-president of Alcoa; *Admiral Ben Moreell*, chairman of Jones and Laughlin Steel; and *Charles J. Stilwell*, president of Warner and Swasey.

The Commission task forces have found that the possibilities for savings, without impairing government functions, are enormous. These are typical of possible savings: the Defense Depart-

ment could lop off \$2 billion a year through better inventory control and more efficient buying; economy in handling paper work of government could save another \$1 billion; improvement in civilian employee administration, reducing the 25 per cent annual turnover, together with some reduction in numbers would save \$1 billion without hardship.

The Hoover Commission has completed the major portion of its studies and has rendered its reports and recommendations to congressional committees and administrative agencies concerned. Already, opposition has developed on the part of bureaucrats to many of the recommendations. Congress has done little about these recommendations, mainly because it has received few expressions of favorable public opinion, urging it to act on these recommended changes.

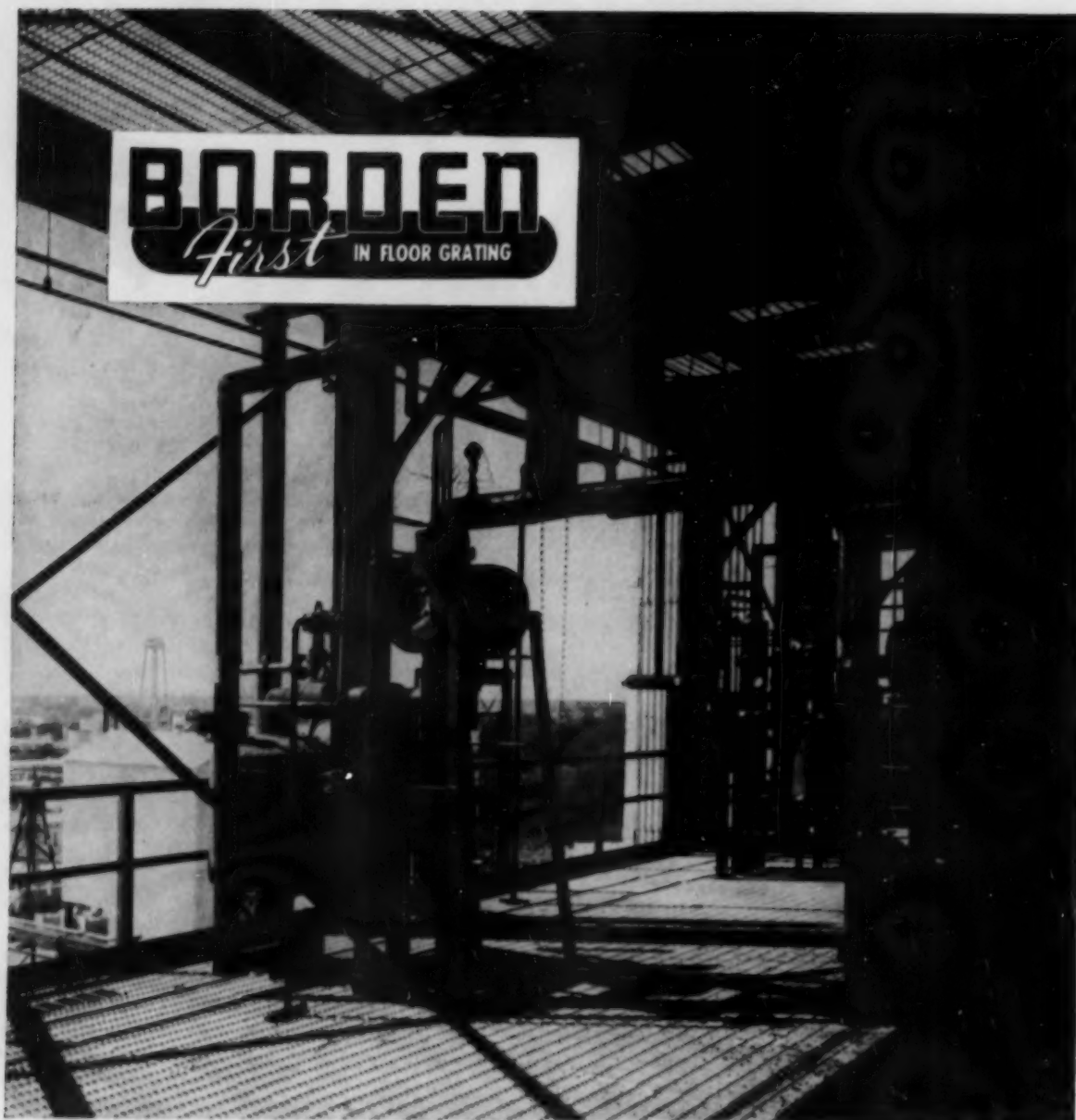
What the reader of this magazine needs to realize is that the responsibility for getting these economies adopted rests with himself in the final analysis. You are the man who votes and, because the men in Congress from your area are particularly sensitive to votes, the opinions you give them will carry weight.

If you are like the average businessman, you are completely tired of having to pay and pay and pay a lot of your money in federal taxes, only to watch it go down the drain in wastefulness and extravagance. Now, you can do something about it—you have a compelling reason to write your Senators and Representatives in Washington to say that you are tired of high federal taxes and federal extravagance, to say that you want them to study the Hoover Commission recommendations and to put these recommended economies into effect. Your nine-cent investment today in three letters will pay handsome dividends in future years!

By **W. J. ROOKE**

Chairman of the Board

W. R. C. Smith Publishing Co.



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# INDUSTRY SPEAKS

SOUTHERN POWER  
AND INDUSTRY

## WATER RESOURCES of the South

### Water Laws . . . Supply . . . Demand . . . Conservation

Adapted from comments by R. GRAHAM WAITT before the Fourth Municipal and Industrial Waste Conference held at the College of Engineering, Duke University.

Mr. Waitt is a Civil Engineer, Registered Professional Engineer and an Attorney at Law with the firm of McKensie, Kaler & Shulman, Atlanta, Georgia. He is also a member of the Georgia Engineering Society.

LET US examine for a moment, in a general way, the water laws of the South. In the main, all states east of the Mississippi have the same basic water laws. These laws might be divided into three basic parts: surface water flowing across lands; water flowing in well defined, non-navigable streams; and water flowing underground.

**Surface water** refers to water flowing on the surface of land, as a result of rainfall or snow, until it reaches a definite water source. Generally speaking, the owner of the lower land must permit the surface water from the higher land of his neighbor to flow over his land.

**Water flowing in well defined, non-navigable streams**—There are two basic doctrines concerning this water: the riparian rights doctrine and the prior appropriation doctrine. States east of the Mississippi have adopted the doctrine of riparian rights. The prior appropriation doctrine is found in the far western states.

A riparian proprietor (the South) is entitled to the natural flow of the stream—undiminished in quantity and unimpaired in quality, except as occasioned by reasonable use by other like proprietors. Riparian rights are inseparably annexed to the soil and pass with it as part and parcel of it, and are not dependent on owner's actual use or appropriation of water.

In Georgia, there is a statute with reference to the riparian owner's right to the effect that the legislature has no right to compel or interfere with him in the stream's lawful use, for the benefit of those above or below him. Thus, every riparian owner is entitled to a reasonable use of the stream; to have the stream flow without material diminution; and to have the stream flow without pollution.

The riparian owner is one who owns property along the banks of a non-navigable stream. He

is not the owner of the water; he only has a reasonable use of the water. However, this riparian right is an incident of property, just as other rights in the land. The term "reasonable use" has found varying interpretations by the courts. Generally, it means for domestic purposes, watering of stock, use for power, and use in industrial processes.

Note, however, that this riparian right is restricted to riparian owners and does not extend to non-riparian lands. A town which piped water several miles to its inhabitants was stopped from doing so. As to reasonable use, an upper riparian owner maintained a dam to supply power to his mill. By means of this dam he cut off the entire flow of the stream from 6 pm each night until 6 am the next morning. This was held to be unreasonable as applied to a lower riparian owner who operated a grist mill.

**Water flowing underground**—Water which percolates through the soil is treated like surface water which we considered, and the owner of the land owns the water. Underground water which flows in well defined channels is treated like surface water in well defined streams. While these remarks are somewhat oversimplified, the law for ground water is very similar to the law for surface waters. There has been much less litigation about this class of water.

#### Rights Somewhat Indefinite

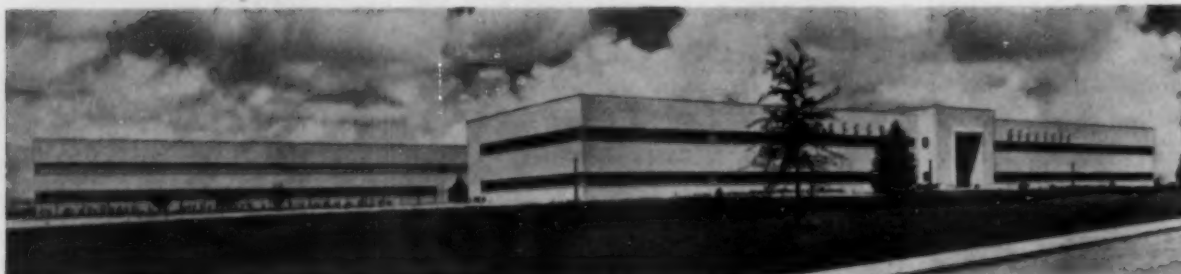
The doctrine of riparian rights gives individual owners of land certain rights. But these rights are somewhat indefinite. The owner of an industrial plant which would require quantities of water, and to which chemicals must be added for his processes might not want to risk returning polluted water to the stream for fear of damage to a lower riparian owner.

The loss to the economy of the area might be far greater than the real value of the water to the lower riparian owner. Also note that the enforceability of the rights of the riparian owner depends upon the individual taking action in the courts. The state, as representative of the people, has little or no say in the matter. However, as states have become industrialized and the problem of the streams has begun to affect the health of the state, the various states have adopted regulatory health measures to control stream pollution. These

(Continued on page 110)

**New Western Electric Company Plant  
Makes Communication Devices, Winston-Salem, North Carolina**

## Planned and Perfected Work Areas



Front elevation view of Western Electric's new plant at Winston-Salem, N. C. Built to produce communications devices, the plant uses about 625,000 sq ft of floor space on a 62 acre site. Partially shown behind the office building in the foreground is the 760 ft wide by 360 ft deep manufacturing building.

**T**HE Western Electric Company recently completed its newest manufacturing facility at Winston-Salem, N. C. Designated the Lexington Road Plant of the Radio Division's North Carolina Works, the plant is in full operation and will make communications devices for the Bell Telephone System and the Armed Forces. Located on a 62-acre site on the city's western boundary, the modern facility occupies 625,000 sq ft of floor space and employs 4000 men and women.

**A** LARGE plant of special design was necessary, according to Mr. Fred E. Henderson, Works Manager, to consolidate various manufacturing and warehousing activities formerly carried on in leased locations in the Winston-Salem area. The North Carolina Works, for which the Lexington Road Plant will serve as headquarters, also includes manufacturing plants at nearby Greensboro and Burlington, N. C. Mr. Henderson also stated that these locations were not expected to be affected by completion of the new plant.

Built under the supervision of Western Electric engineers, the Lexington Road Plant is comprised primarily of a manufacturing building, office building, and a combined boiler house and service building. The establishment includes a cafeteria which will seat about 850 people, medical facilities and, for the convenience of employees, 11

acres of paved parking areas that can accommodate 1530 cars.

### Manufacturing Building

The manufacturing building is 780 ft wide by 360 ft deep and consists of a main floor and a partial lower floor. The main floor is made up of a large manufacturing area, 620 ft by 280 ft. This area is surrounded by an 80 ft wide periphery which is partitioned for process, stock storage, office areas, special process rooms, laboratories, employees' club, cafeteria and kitchen, and toilet and locker rooms.

The natural slope of the terrain made it advantageous to construct a lower level which is located in the west half of the building, in an area 780 ft wide and 160 ft deep. On this lower floor is the receiving and shipping area with six truck-loading docks, a metal finishing area, ventilating fan rooms, electric switchgear areas for power dis-

tribution, purchased-material inspection areas, and machine shop, sheet metal shop, and other such heavier manufacturing areas requiring large presses and screw machines.

The main floor of this building also has mezzanine areas on the north, east, and south sides. The north mezzanine is used as a mechanical-electrical engineering laboratory. The east mezzanine consists of a credit union office, telephone exchange equipment and switchboard rooms, and an air-conditioning equipment area. The south mezzanine serves as an overflow dining area and also contains two private dining rooms which are partitioned from the remainder of the mezzanine which is used for process-stock storage.

The roof of the new plant is of a Fiberglas form board base with poured gypsum and a 4-ply 20-year bonded built-up roofing. White marble chips are spread on top of the roofing to reflect the sun's heat rays and thereby reduce summer heat transmission into the building. This roof provides a four-hour time lag in solar heat transmission.

Projecting above the main roof are fifteen 45 ft x 20 ft penthouses that house heating, air condition-

ing, and ventilating equipment.

General lighting is provided at approximately 50 foot-candles by means of two-tube, 75 watt slim-line fluorescent fixtures arranged on 10 ft centers in continuous rows. On the main floor, the rows run the width of the building while on the lower floor the rows run north and south the length of the building.

There are approximately 2900 fixtures on the main floor each with a 10% upward-light component. The approximate 1200 fixtures on the lower floor have a 25% upward-light component. The upward-light component was provided to reduce the brightness ratio and results in better sight comfort. The light fixtures are arranged to conform with the architecture of the building.

The lighting in this building is fed from a 480/277 volt power system, and is the first full-scale lighting system of this type to be installed by Western Electric.

#### Power

Power is supplied to the plant by the Duke Power Co., at 13,000 volts from approximately 1½ miles away. The capacity of their installation at the main outdoor substation west of the service building, is 3000 kva, serviced through three single-phase 1000 kva transformers. A voltage regulator with a range from 500 kva to 6250 kva is located in the main substation to maintain a constant primary distribution voltage of 4160 volts.

Power is distributed to the plant at a constant 4160 volts to 2000 kva double-ended unit substations located in each end of the lower floor of the manufacturing building. These two transformers feed 3420 ft of 480/277 volt 600 amp bus duct of the plug-in type. They also feed a combination low and medium-voltage underfloor distribution system for bench assembly work.

#### Heating and Ventilating

The heating and ventilating system was designed to keep the pressure inside the building higher than that on the outside to keep dust at a minimum. This is necessary in the process of manufacturing sensitive equipment.

Perimeter heating of the build-



View of one section of the manufacturing area. Lighting is provided at 50 foot-candles and is fed from a 480/277 volt power system. This is the first full scale use of this type of lighting system by Western Electric.

ing to overcome heat losses through walls and glass is accomplished by the use of wall radiation. This wall radiation consists of thin tube convectors with hot water used as the heating medium. Hot water is obtained by using steam from the steam-distribution system to heat the water for the hot-water radiation system.

The heating system of the perim-

eter is supplemented by a space-heating system utilizing 13 penthouses on the roof of the building as fan rooms, and an additional 3 fan rooms for the lower floor. The air is brought in at one end of the penthouse or into a fan room, passed through oil bath self-cleaning filters and then through a system of heating coils which use steam as a heating transfer me-

Testing area on the main floor of the manufacturing building. In most cases, these are special-purpose test sets, designed by Western Electric and Bell Telephone Laboratories.







Double-deck storeroom offers almost 60,000 sq ft of floor space, conveniently located on the main floor over the outside shipping and receiving platforms. The area is served by a large freight elevator (with a stop on the mezzanine) and four 500 lb capacity dumbwaiters.

dium. A large fan or blower then takes the air and passes it to the floors of the building through a system of duct work. This duct work is suspended in the trusses, and outlets are adequately spaced to cover the floor area of the building.

There is also a system of gravity roof ventilators used in conjunction with this system. In the summer, no air is re-circulated and the fans have capacity to bring fresh air into the building at the rate of 15

air changes per hour for the main floor and 10 air changes per hour for the lower floor. With this amount of air passing through the building some cooling effect is accomplished. The amount of air brought into the building is balanced by process-exhaust systems and the use of roof ventilators as required.

#### Boiler House

The boiler house is a one-story structure 65 ft by 100 ft with a full

Tool room of the new plant is located on the perimeter of the main manufacturing floor and is completely enclosed.



lower floor below grade. This building contains steam-generating units with their associated equipment, air compressors, refrigeration machines, fire pumps and a 750 kva unit substation.

To serve the requirements of this building both 4160 volt and 480 volt services are used. Two 150 hp synchronous motors for air compressors and two 300 hp and one 400 hp synchronous motors for refrigeration equipment are served by the 4160 volt feeder. The 750 kva unit substation serves the 480 volt system for all other equipment such as boiler auxiliaries, chilled water pumps, condenser water pumps, etc. A tunnel connects the lower floor of the boiler house with the lower floor of the manufacturing building and houses the runs of piping between the buildings.

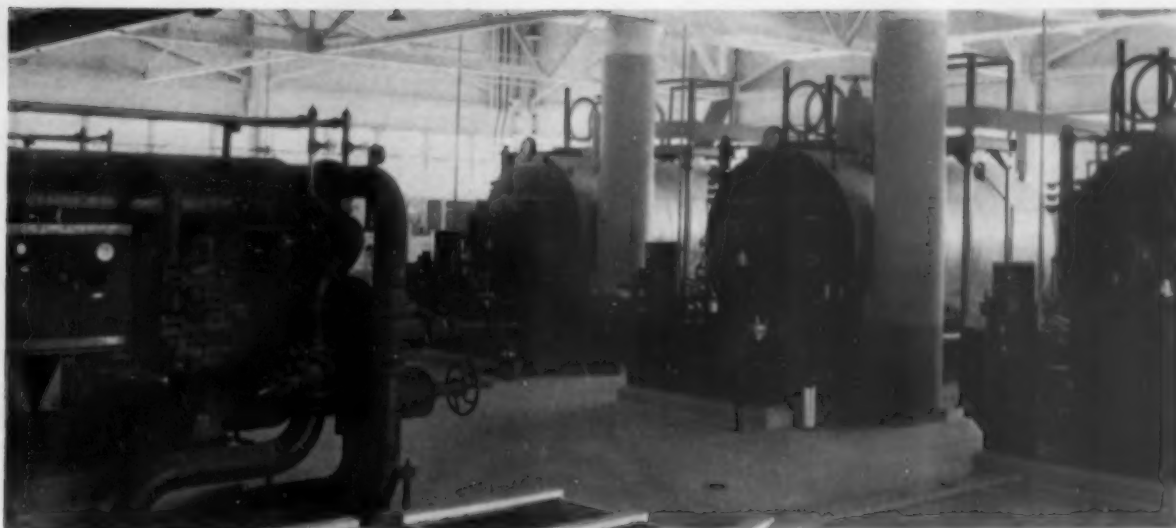
#### Steam Generating System

Steam is generated by three 250 hp boilers capable of producing 25,950 pounds of steam per hour at 212 F. The units are designed for 125 psig but are operated at 100 psig to produce 24,810 pounds of steam per hour. Of this capacity, approximately 4000 pounds per hour is required for process. Units are equipped for combination oil and gas firing, requiring only a manipulation of controls and fuel valves to change from one fuel to the other.

Normally the boilers are fired with gas, but as a standby fuel in case of a gas shutdown there are two 15,000-gallon oil tanks filled with No. 2 oil. An alternate for gas firing would be No. 6 oil if it became economically feasible. To fire No. 6 oil the tanks have been provided with heaters to increase the flow of the oil from the tank. Secondary heaters and pumps have also been installed to feed the oil to the boilers at the proper temperature. A change from gas to No. 6 oil can be made without the installation of additional equipment.

Condensate is returned from the heating system and manufacturing processes to a surge tank on the lower floor of the boiler house. From this tank the condensate is pumped to the deaerator where oxygen is removed. The heated water is then pumped back to the boilers by feedwater pumps controlled by the water level in the





Boiler room facilities at Lexington Road Plant of Western Electric Company.

boiler. Boiler water is chemically treated internally to control scale and sludge deposits on the boiler.

#### Waste Treatment

A 12 in. vitreous-tile sanitary sewer pipe was constructed to handle 1,360,000 gallons per day capacity. This sewer connects with the 18 in. city sewer line approximately 600 feet from the south property line and handles all sanitary sewerage released from the plant, as well as the plating waste water. This plating waste water is treated before going into the city sewer to make it harmless to human life and fish life, and to prevent it from interfering with the sewage treatment process at the city plant.

The acid and alkaline water from the manufacturing plating area is carried through a pipe trench to the mixing tanks. Here it is treated with caustic solution to assure that the water is not acid, and then the water is released to the sewer system. Cyanide wastes are also carried through the same pipe trench, but are retained in a separate series of mixing tanks, sufficiently long to oxidize them with chlorine before releasing the harmless effluent to the sewer system.

Caustic for these treatments is obtained in tank-car quantities diluted and stored in two 5000 gallon tanks. Chlorine is received in 150 pound quantities in steel cylinders which are stored in a quonset-type building.

#### Compressed Air

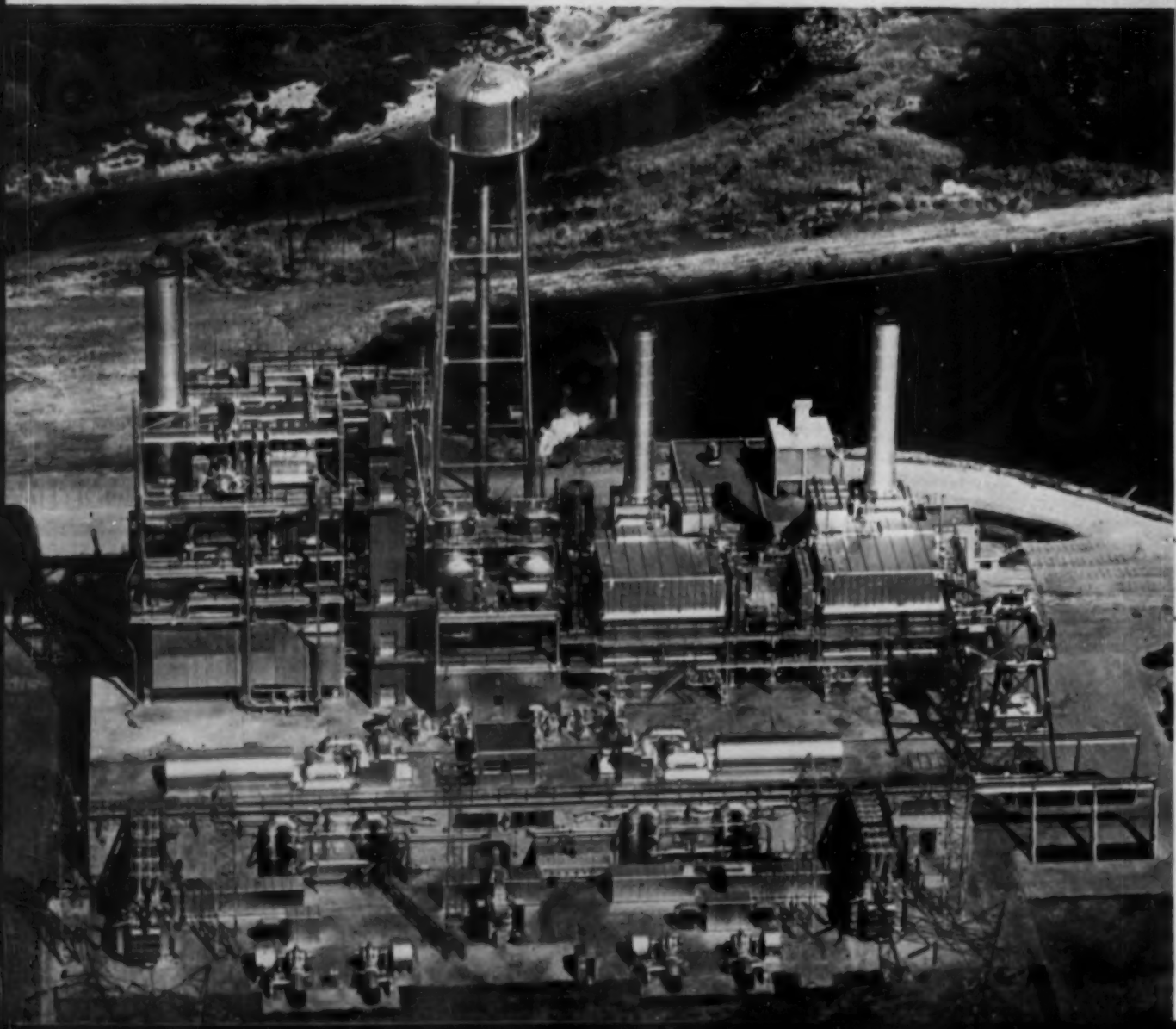
Clean, oil free, dry compressed air is essential to the plant in various manufacturing operations. This compressed air is obtained by taking air from out-of-doors, filtering, compressing and then dehumidifying it. Two 800 cfm rotary air compressors are located in the boiler house. These two-stage compressors raise the pressure of the air to 100 psi. As the air is compressed, and after it leaves the compressor, it is cooled with recirculating water

in heat exchanges to within 2 degrees of the entering temperature. The compressed cool air now passes through cyclone separators to remove all liquid water and oil. From there it passes through a dehumidifier which lowers the dew point to 40 degrees in order that no further liquefaction can take place in the pipes or through the processes due to low air temperature.

Compressed air is then fed to a loop in the manufacturing building  
(Continued on page 107)

#### Principal Service Equipment

Fluorescent Lighting Fixtures .....	Day-Brite Manufacturing Co.
Unit Substations .....	Pelham Electric Manufacturing Co.
Bus Duct .....	National Electric Products Co.
<b>Penthouse Equipment:</b>	
Heating Coils .....	John J. Nesbitt, Inc.
Filters .....	Dollinger Manufacturing Company
Fans .....	New York Blower Co.
Cooling Coils .....	John J. Nesbitt, Inc.
Wall Radiators .....	Trane Manufacturing Company
Water Heater .....	Dominion Iron Works
Roof Ventilators .....	The Swartwout Company
Waste Water Treating Plant .....	Wallace & Tiernan Manufacturing Co.
Boilers .....	Superior Combustion Industries
Air Compressors .....	Fuller Manufacturing Co.
Motors .....	Electric Machinery Manufacturing Co.
Refrigeration Machines .....	York Manufacturing Company
Motors .....	Electric Machinery Manufacturing Co.
Water Cooling Towers .....	Lillie Hoffman Manufacturing Co.
Fire Pumps .....	Peerless Pump Division
Diesels .....	General Motors Corp.
Engineers, Architects and Contractors .....	Walter Kidde Constructors, Inc.;
	West Building Co.; Fowler Jones Const. Co.; R. D. Tillson &
	Assoc.; Rowe-Goodin-Jones; Bryant Elec. Co.; Colter & Chappell



# Outdoor Station Design—160,000 KW

## Saves Money For Public Service Company of Oklahoma

**By R. O. NEWMAN**

Assistant to the Superintendent  
of Operation and Construction  
Public Service Company of Oklahoma  
Tulsa, Oklahoma

**The results have been quite gratifying. There have been no outages due to outdoor installation, and no loss of instrumentation or piping due to freeze-ups.**

← **LEFT ABOVE**—General view of plant area. Note cooling water lakes, and cooling towers in right foreground.

← **LEFT**—Detailed view of outdoor station, showing arrangement of equipment. One unit is served by large boiler at left, and the two smaller boilers supply the turbine at right center.

**S**OUTHWESTERN Station of Public Service Company of Oklahoma was put in service a year and four days after construction started. The plant is centrally located in the Southwestern Division of Public Service Company, thirty miles west of Chickasha on the bank of the Washita River.

The site was selected because it possesses the best water supply available in western Oklahoma. It is also near the center of the Ana-

darko basin oil and gas fields where a dependable supply of low cost fuel was available.

The station consists of two 80,000 kw units with a total capability of 160,000 kw. Unit No. 1 was placed in service July 11, 1952,

and Unit 2 was placed in service March 12, 1954.

This station, designed for an ultimate capability of 500,000 kw, is now the largest on the Public Service system, which consists of seven major stations with a capa-



R. O. Newman

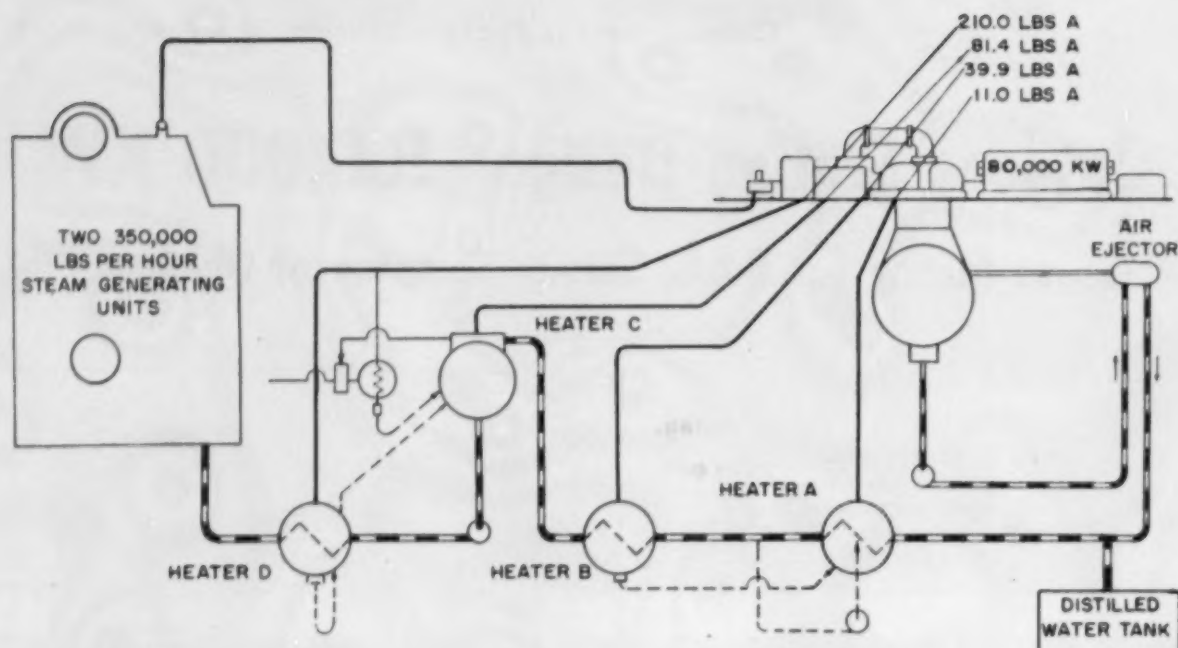


R. W. Ingalls

**PLANT PERSONNEL:** Ralph Ingalls is Chief Engineer of Southwestern Station; Wayne Schweikhard is Assistant Chief Engineer; and Don R. Campbell is Results Engineer.

**THE AUTHOR:** Mr. Newman was graduated from Oklahoma A. & M. College in 1942 with a B.S. Degree in Mechanical Engineering. During the war he served in the Ordnance Department of the Army, overseas in the European theatre in England, France and Germany. He advanced to the rank of a Captain and was discharged in 1946.

In 1946, he joined Public Service Company as a Junior Engineer at the Tulsa Power Station. Later that year, he was promoted to Results Engineer of the same Station. In November, 1947, he was transferred to the Weleetka Power Station as Assistant Chief Engineer. In 1950, he was transferred to the Elk City Gas Turbine Plant for the installation of the gas turbine and remained on as Chief Engineer for the first year's operation. In March, 1952, he was transferred to Southwestern Station as Chief Engineer and remained there through the construction of both Units. In September, 1954, he was transferred to the General Office as Assistant to the Superintendent of Operation and Construction.



Typical performance diagram  
for Southwestern Station

Steam rate to turbine (lb/kwh).....	8.28
Btu/kwh to turbine .....	9,337
Boiler efficiency.....	84.2
Btu/kwh sent out (100 % Op. Efficiency).....	11,612
Plant thermal efficiency .....	29.39

bility of 416,500 kw. Southwestern Station is connected with the rest of the Public Service system by two 138 kv transmission lines and two 66 kv transmission lines.

Southwestern Station is Public Service Company's first experience with totally outdoor station design, although units with outdoor boilers had proved satisfactory. The station was laid out for two operating levels by selecting condensers requiring low head room. An important feature of location was that it enabled the plant to be built on a solid base of sandstone, and expensive foundations were not required.

The structure is primarily of reinforced concrete with a steel super-structure which carries the evaporators and deaerating heaters. The central control room is located directly below the evaporators on the turbine deck, and contains the boiler controls, turbine and generator controls and transmission control panels.

The plant offices and meeting room are located on two levels directly below the No. 1 boiler. A separate steel quonset building built early in the construction of the first unit, was used for storage

during construction and now provides storage facilities for spare parts.

#### Fuel Supply

The primary fuel is natural gas, which is supplied through a fifty-mile 16 in. gas transmission system built into the gas fields where gas is purchased directly from the producer at the well head. Stand-by facilities consist of fuel oil burning equipment and two 50,000 barrel tanks. The station is so designed and arranged that coal handling and storage facilities can be installed and the boilers converted to pulverized coal.

#### Cooling Water

The low rate of flow in the Washita River necessitated the erection of a large eight-cell double flow cooling tower with each unit. Two large reservoirs for emergency storage and for settling out the highly turbid waters were constructed. Water is pumped from the river into the storage reservoirs which have a capacity of sixty million gallons.

Water is pumped from the reservoir into a water treating plant, where it is chlorinated, lime softened and clarified. It is neutralized with concentrated sulfuric acid and then filtered in three gravity filters of 1400 gpm capacity each. This sterile sanitary water is used for all general purposes as well as for cooling tower make-up. The evaporator make-up is further softened by sodium-catecter and deaerated before going to the evaporator.

#### Generators and Controls

An air conditioned central control room, the first in the Public Service Company system, provides a centralized watch station with all controls for the turbine, generator, boiler, and transmission system. A single operator in the control room is responsible for the boilers, turbines, generators, and the transmission substation. Other operators on shift are the watch engineer, auxiliary operator and the cribhouse operator.

The turbine generator designed



for outdoor operation is on the main operating deck. The turbine is covered with a lagging of the glove fit design; the exciter is covered with a walk-in enclosure. The units are identical Westinghouse preferred standard tandem compound turbines. The generators are rated at 88,235 kva at thirty pounds hydrogen pressure, which is the normal operating pressure. The units are arranged opposite hand so that both turbines are convenient to the control room, which is in line with the boilers and centered between the two units.

#### Heaters, Crane, Pumps

Two low pressure heaters on each unit, as well as the high pressure heater on each unit, are operated from the turbine room floor and are so arranged that they can be serviced from the thirty-five ton gantry crane. This gantry crane also has a ten-ton auxiliary hook arranged on an out-rigger, which is used to service light loads and extends off the deck for service to that portion of the condensers which is outdoors.

The plant has three identical boiler feed pumps, each with a capacity of 755,000 pounds per hour at 1235 psi. They are arranged so that one pump serves as spare for both units. These

pumps are driven by 1750 hp, 3600 rpm, 2300 volt motors.

#### Electrical Equipment

The 88,500 kva 13.8 kv to 138 kv main power transformer is located adjacent to the station and connected to the generator leads by means of isolated phase bus duct. The 138 kv switch yard, located some three hundred feet away, contains the oil circuit breakers, as well as a relay and control house. Connecting to the 138 kv switch yard is the 50,000 kva, 138/69/13.2 kv, three-phase, oil forced air auto transformer, which serves the 66 kv substations. The tertiary winding supplies the source of power for the station auxiliaries, as well as a radial feeder.

#### Steam Generators

While the two steam generators are identical, the boilers supplying them are not. The No. 1 Unit is supplied by two boilers and No. 2 Unit is supplied by only one boiler. All three boilers are of the same make, and are similar except with regard to size and capacity.

The steam generators on Unit 1 are Babcock & Wilcox pressurized furnace Stirling boilers, which operate at 350,000 lb/hr. Steam leaves the boiler at 950 pounds and 910 F. Steam temperature

control is effected by submerged drum-type attenuators in the lower drums of the boilers.

Six ring-type burners in each boiler are used while burning natural gas. The stand-by fuel oil is burned by means of mechanical atomized guns. The igniters use natural gas and are used in an emergency by means of an underground gas storage supply.

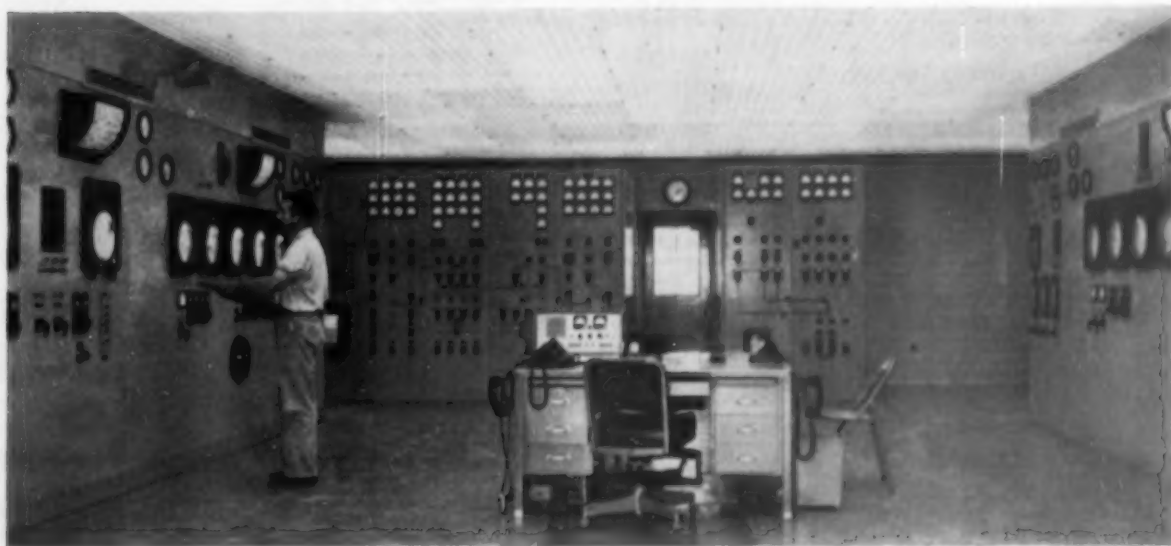
The forced draft fans on boilers 1 and 2 are located outdoors and force the air through the Babcock & Wilcox tubular air heater into the burner box.

The single boiler on No. 2 unit, which operates at 700,000 lb/hr, has two fans which operate in parallel. For details on this boiler, see the accompanying table of principal equipment.

In order to keep all high pressure piping out of the control room, extensive use was made of transmitters for both pressure, flow, and level, with the transmitters being located convenient to the source of primary element of the instrument and the intelligence transmitted either electronically or pneumatically into the central control room. The protection from damage due to severe weather necessary for these instruments and transmitters was accomplished through

*(Continued on next page)*

View of the main control room.



the use of soil wire for tracing the lines, small heaters, and insulated covers for the various instruments, together with thermostatically controlled resistance heating units.

This station challenged the ingenuity of both the designers and the operating personnel to adequately protect the instruments, piping and equipment, which were to be located out of doors. The

results have been quite gratifying. There have been no outages due to the outdoor installation, nor has there been any loss of instrumentation or piping due to freeze-ups.

## PRINCIPAL EQUIPMENT—SOUTHWESTERN STATION

### Public Service Company of Oklahoma

#### GENERAL DATA

Name of Station.....Southwestern Station  
Station Site.....Washita, Oklahoma  
Total Generating Capability.....160,000 kw at present  
Total Boiler Capability.....1,400,000 lb/hr  
Steam Conditions.....905 psig 900°F  
Cooling Water Source.....Washita River  
Design and Construction.....Sargent & Lundy Engineers, Public Service Company Construction Dept.

#### TURBINE-GENERATORS

Turbines.....Two—Westinghouse Electric Company, 3600 rpm—80,000 kw each  
Generators.....Two—Westinghouse Electric Company, 88,285 kva—14,400 v—3 phase direct connected  
Exciter.....Two—Westinghouse Electric Company, 250 v—215 kw—3600 rpm direct connected  
Pilot Exciter.....Two—Westinghouse Electric Company, 2.5 kw—250 v—direct connected  
Generator Coolers.....Four—Westinghouse Electric Company, 1400 cu ft hydrogen capacity  
Turbine Oil Coolers.....Four—Westinghouse Electric Company, 1100 sq ft internal  
Turbine Oil Filters.....Two—Bosner, Inc., pressure type, 25 sq ft 8 gpm. Two—Bosner, Inc., rotary type, 50 ft h<sub>3</sub> 8 gpm

#### CONDENSING EQUIPMENT

Condenser.....Two—Westinghouse Electric Company, horizontal, surface type, radial flow, two pass 60,800 sq ft, 7794-1" O.D. x 30'-0" tubes #18 BWG cupro nickel  
Circulating Pumps.....Four—Westinghouse Electric Company, horizontal, centrifugal type, 30,000 gpm each, driven by 300 hp motor 495 rpm base ventilated outdoor type  
Condensate Pumps.....Four—Westinghouse Electric Company, multi-stage pit type, vertical mixed flow 1200 gpm, driven by 300 hp motor—1160 rpm  
Air Removal Equipment.....Two—Westinghouse Electric Company, twin element two stage air ejectors  
Priming Ejectors.....Two—Westinghouse Electric Company, 900 lb/hr capacity at 25 in. Hg. vacuum  
Cooling Tower.....Two—Marley Company Type #2-24E2 double flow induced draft 60,000 gpm water at 102.5 F and 86.5 F w/75 F dry bulb

#### BOILERS AND EQUIPMENT

Unit No. 1—Boilers.....Two—Babcock & Wilcox Company, two drum stirring, pressurized furnace design pressure 1080 psi outlet pressure 950 psi, heating surface 11,466 sq ft each, steam drum 5' x 36'6", mud drum 4' x 36'6"  
Superheater.....Two—Inverted loop tube type, heating surface 7966 sq ft  
Air Heaters.....Vertical tube type, heating surface 53,300 sq ft  
Safety Valves.....Two—4" Consolidated (saturated steam), 1-3" Consolidated (superheated steam) each boiler  
Blow Off Valves.....Two sets—1½" Edward per boiler  
Water Columns.....One—Diamond Hi-Lo Column, Two—Bicolor Water Glasses per boiler  
Blow Off Tank.....One—American Boiler & Tank Company for both units  
Unit No. 2—Boiler.....One—Babcock & Wilcox Co., two drum stirring, pressurized furnace, design pressure 1060 psi, outlet pressure 950 psi, heating surface 36,314 sq ft, steam drum 6' x 45'0", mud drum 42" x 45'0"  
Superheater.....Two—Pendant type, heating surface 11,800 sq ft  
Air Heaters.....Two—Vertical tube type, heating surface—123,400 sq ft  
Safety Valves.....Three—3" Consolidated (saturated steam), One—3" Consolidated (superheated steam)  
Blow Off Valves.....Two sets—2½", Edward Welded  
Water Columns.....Two—Diamond, Bi-Color Hi-Lo alarm

#### FUEL BURNING EQUIPMENT

Burners.....Babcock & Wilcox, circular register gas and oil suitable for pulverized coal, 12-Unit No. 1, 9-Unit No. 2  
Fuel Oil Pumps.....Two—Quimby, Capacity 55,000 lb/hr. One 350 gpm at 75 ft hd  
Fuel Oil Heaters.....Two—Quimby, heating surface 675 sq ft. Oil heating rate 55,000 lb/hr. Four Griscom Russell tank heaters, one—112,500 lb/hr heating capacity, three—175,000 lb/hr heating capacity  
Fuel Oil Storage Tanks.....Two—Chicago Bridge & Iron Company, capacity 50,000 bbl. One—25,000 gal capacity  
Gas Pressure Regulating Station.....Two—Fisher regulating valves 40 to 500 psig range  
Burner Pressure Regulating Valves.....Two—Unit No. 1, One—Unit No. 2, Bailey controlled Fisher valves 75 psi to 30 psi range  
Combustion Controls.....Bailey Meter Company, compressed air operated

#### DRAFT EQUIPMENT

Stacks.....Two—Unit No. 1, Patterson Steel Company (gunite lined) 61' high. One—Unit No. 2, Boardman Company (gunite lined) 68' high  
Forced Draft Fans.....Four—American Blower Corp., driven by 600 hp motor 330 rpm  
Draft Gauges and Controls.....Bailey Meter Company

#### BOILER FEEDWATER EQUIPMENT

Boiler Feed Pumps.....Three—Ingersoll Rand Company, barrel type, 1235 psi head, 755,000 lb/hr capacity, driven by 1750 hp 3600 rpm 2300 v motor  
Bleeder Heaters.....Three—Westinghouse Electric Company, vertical U tube, four pass, one—2500 sq ft heating surface, one—3025 sq ft heating surface, one—3740 sq ft heating surface  
Deserating Heaters.....Two—Cochrane Corporation, direct contact jet type with internal vent condenser, 695,000 lb/hr capacity  
Feedwater Regulators.....Bailey Meter Company, 3 element type  
Evaporators.....Two—Westinghouse Electric Company, horizontal bowed tube submerged type heating surface 1000 sq ft, capacity, 22,000 lb/hr, Cochrane deserating preheater with each  
Make-up Pumps.....Four—Worthington Pump and Machinery Corporation, capacity, 1000 gpm, driven by 15 hp motor

#### WATER TREATING EQUIPMENT

Treating Plant.....Indeco, Incorporated  
Clarifiers.....Two—With Timer controlled concentrator, 150,000 gal capacity  
Chlorinator.....One—Wallace & Tiernan, automatic control solution feed type  
Filters.....Three, gravity feed type, 1400 gpm capacity each, 1820 sq ft each, 24,000 lb Anthracite filtering medium each  
Softeners.....Three Automatic sodium catexers, 40,000 gal per cycle  
Ph Controller.....One—Leeds & Northrup, immersion type electrode and recorder for automatic stabilization of clarified water  
Chemical Feeders.....Two—Lime slakers and volumetric feeds. Two—Alum solution feeders. One—Quicklime conveyor system

#### ELECTRICAL EQUIPMENT

Generator Bus.....Two—Westinghouse  
Main Power Transformers.....Two—Westinghouse Electric Co., 88,500 kva 12.5/138 kv type FOA forced air, forced oil, delta-wye  
Auxiliary Transformers.....Three—Westinghouse Electric Co., 6000 kva—14.4/2.4 kv Delta  
440 V Transformers.....Three—Westinghouse Electric Co., 500 kva—2400/480 Delta  
Cooling Towers Transformers.....Three—Westinghouse Electric Co., 750 kva—2400/480 Delta

**3400 V Switchgear**.....Five—Westinghouse Electric Company, 150,000 kva, outdoor metalclad, air circuit breakers

**410 V Switchgear**.....Two—Westinghouse Electric Company, outdoor unit end type, 50,000 and 15,000 amp circuit breakers

**110 V A-C Control Supply**.....Two—Westinghouse Electric Company, 15 kva—480/120 v transformers and distribution systems

**Lighting Supply**.....Two—Westinghouse Electric Company, 350 kva transformers with automatic transfer to station battery for emergency circuits

**Lighting Voltage Regulator**.....One—Westinghouse Electric Company 37½ kva, 2400 v, 150 amp induction regulator

**Motor Control Centers**.....Six—Westinghouse Electric Company, combination line starters with thermal overload protection

**2300 V Motors**.....Westinghouse, Allis-Chalmers Elliot Company, & General Electric Company. Squirrel cage type, drip proof, suitable for outdoor service, across-the-line starting

**Main Control Board, Instrument & Relays, Generator Voltage Regulator & Main generators Leads**.....Westinghouse Electric Company

**Cable Fans**.....Lawrence Tank Company

**Electrical Installation**.....L. E. Meyers Company

**Insulated Cables**.....Okonite Company; Simplex Wire & Cable Company; and U. S. Rubber Company

#### SERVICE EQUIPMENT

**Air Compressors**.....One—Ingersoll Rand Company, for station air, 330 cfm capacity, 100 psig discharge, driven by 50 hp motor, 1200 rpm. Two—Ingersoll Rand Company, for control air, 211 cfm capacity 100 psig discharge, driven by 50 hp motor, 1175 rpm

**Turbine Deck Gantry Crane**.....One—Colby Steel and Mfg. Company, capacity 30 ton, outrigger capacity 10 ton

**Elevated Service Water Tank**.....One—Chicago Bridge & Iron Co., total height 149 ft. capacity 100,000 gallons

**Service Elevator**.....One—Westinghouse Electric Company, capacity 2000 lb

#### PIPE AND PIPE COVERING

**Piping Contractor**.....National Valve & Mfg. Company

**H.P. Steel, E.C.I. Valves**.....Wm. Powell Company

**Small Steel & Non-return Valves**.....Edward Valve, Inc.

**Bleeder Check Valves**.....Atwood & Morrill Company

**Steel Check Valves**.....Chapman Valve Mfg. Company

**Circulating Water Piping**.....Bethlehem Steel

**Butterfly Valves for Circ. Water**.....Henry Pratt Company

**Small Valves, Gauge & Relief Valves**.....Manning, Maxwell & Moore

**Steam Traps (Clark)**.....Meyer Ekstrom Company

**Small Gas Regulators, Float Controls & Pressure Reducing Valves**.....Fisher Governor Company

**Expansion Joints**.....Garlock Packing Company

#### INSTRUMENTS

**Turbine & Boiler Gauge Boards**.....Bailey Motors Company

**Conductivity & Temperature Recorders**.....Leeds & Northrup

**Indicating Wattmeters**.....Westinghouse

**Pressure Gauges**.....Manning, Maxwell & Moore

**Boiler Drum Level Indicators**.....Tarway

**Barometer & Vacuum Gauges**.....Precision Instrument Company

#### STRUCTURAL MATERIAL & SERVICES

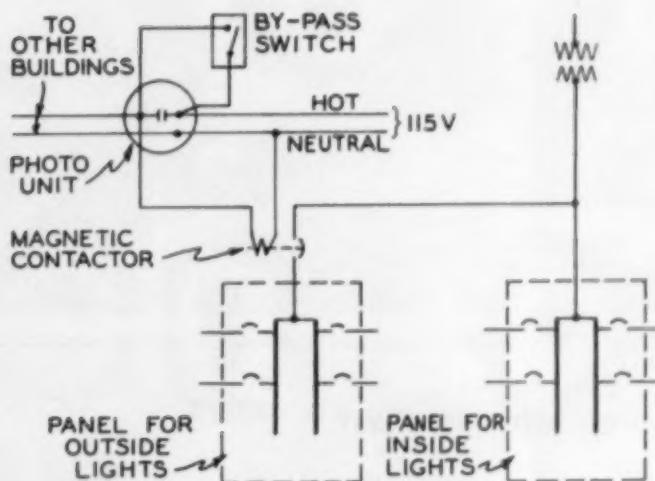
**General Contractor**.....W. R. Grimshaw Company

**Structural Steel**.....Patterson Steel Company

**Reinforcing Steel**.....W&W Steel Company

**Ceramic Tile (Arketex)**.....Sonken Galamba Corporation

**Fixtures**.....Crane Company



### Outside Lighting Control

**I**NDUSTRIAL plant electric power is usually a relatively cheap commodity when considered by the kilowatt hour. The total lighting bill for a year's operation, however, is great enough to warrant attention.

Plants using numerous outside lights, such as building border lights, street lights, flood lights,

etc., can materially reduce their lighting bills by the installation of photo electric control on all of these outside lights. Depending solely upon operators to turn off these lights, usually means that some, if not all are left on far longer than is necessary—in some cases 24 hours a day.

Where each building has its own

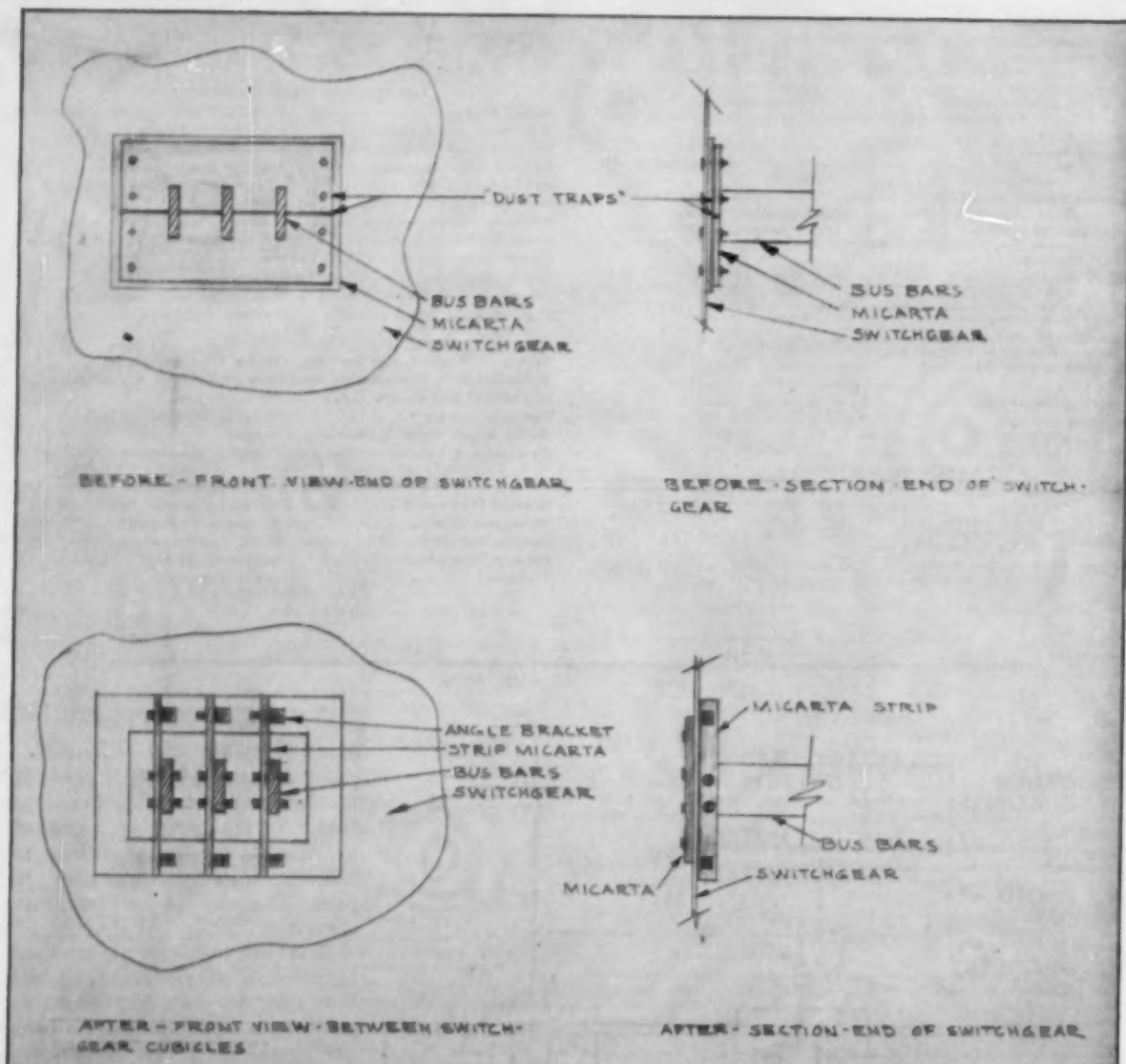
lighting feeder and distribution panel, a separate panel is installed to feed only outside lights. The feeder to this panel is controlled by a contactor large enough to carry its load. The contactor, in turn, is controlled by the photo electric unit.

If several buildings are grouped together, a single photo electric unit may be centrally located to control the contactors in the various buildings. The illustration shows a typical installation.

The photo electric unit should face north and be high enough to avoid dark shadows from adjacent buildings in that direction. Maintenance on these units has proved to be very low, but for testing purposes and in case of failure, a by-pass switch should be installed. This switch may be of the conventional type. However, it is suggested that a key switch be used to avoid accidentally leaving photo electric unit by-passed.

The cost of installation will vary with each plant, but in many cases this cost will be paid for within a few months by savings in both the electric bill and the reduction in lamp replacement cost.

By R. L. GOUCKENOUR, Lake Charles, Louisiana.



## Preventive Maintenance at Georgia Aircraft Plant

# Re-Installation of Micarta Bus Supports

**T**HE LOCKHEED Plant Unit Sub-stations have been in operation approximately thirteen years. The barrier type Micarta bus supports in the low voltage switchgear of the unit sub-stations are beginning to age and are becoming more and more difficult to clean because of the entrapment of dust. (Fig. 1.) The maintenance department of the Lockheed Aircraft Corporation Georgia Divi-

**By L. ANNE BONDS**

Plant Engineering Department  
Lockheed Aircraft Corporation  
Marietta, Georgia

sion studied the problem, and have established a preventive maintenance program, eliminating these "dust traps."

The "blow-out" process used in the preventive maintenance clean-

ing program of the Georgia plant tends to cause the dust to become more compacted. Samples of this dust were removed from the switchgear and tested for metallic content. Results of these tests showed that there is present in the dust the following: Iron, Aluminum, Copper, Trace Zinc, Trace Magnesium, Carbon, and Silicon. The quantitative value of the metals will be cumulative in cer-



tain areas as some of the plant aircraft manufacturing processes will continue to release metallic dusts.

The combined conditions of the collection of dust and the increasing metallic content of the dust indicates the "flash-over" probability will be an increasing factor. The following steps are being taken to eliminate "flash-overs"

caused by the above mentioned conditions.

#### The Program

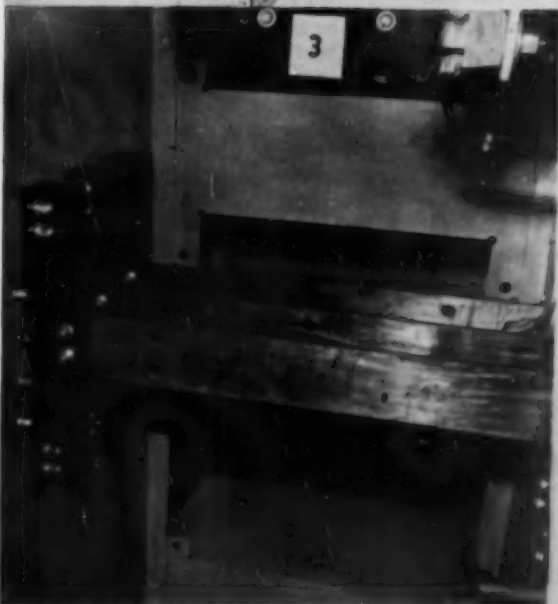
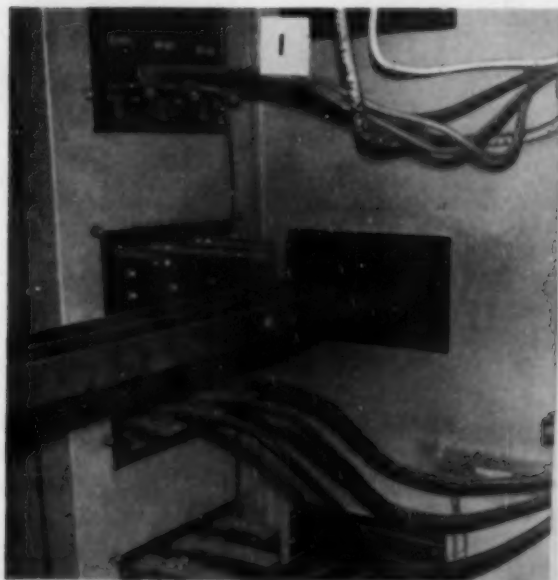
Incorporated in Lockheed's Georgia plant preventive maintenance program for unit sub-stations is necessary time for removal and re-installation of the Micarta bus supports in the low voltage switchgear. This work is

scheduled over the week-ends to avoid interference with the production schedules.

First the barrier type Micarta is removed and sent to the shop where it is cut into strips. Shop time involved in cutting is approximately three hours. New Micarta angles are used where it is impractical to re-use the exist-

*(Continued on page 79)*

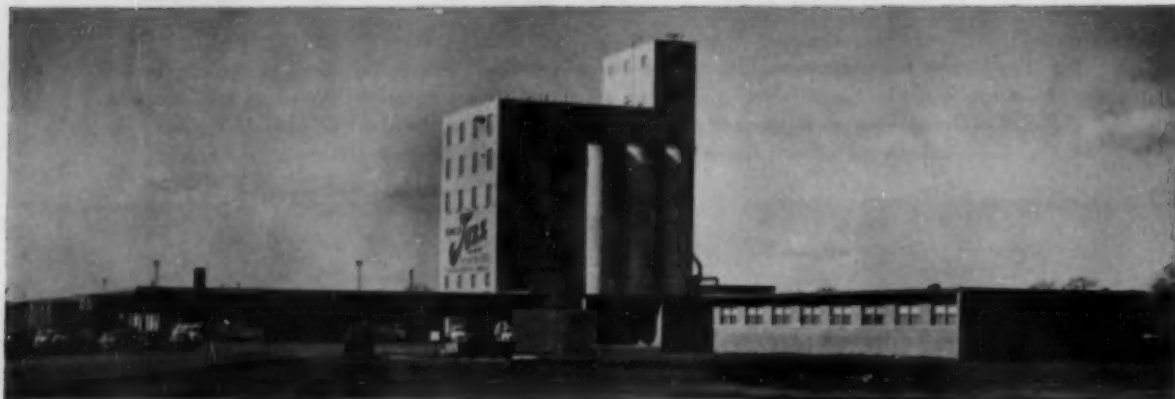
- Fig. 1—Micarta bus supports before change—arrows indicate where dust becomes compacted.  
Fig. 2—Angle Micarta bus supports have been substituted for barrier type Micarta bus supports.  
Fig. 3—Interior view of switchgear showing angle Micarta supports at the ends of the bus.  
Fig. 4—Exterior view of switchgear showing Micarta remounted on outside of switchgear.



## New Feed Plant—

Cosby-Hodges Milling Company, Birmingham, Alabama

# Push Button Weighing and Mixing



The Cosby-Hodges Milling Company plant, Birmingham, Alabama is located on a 35 acre tract with an air conditioned office at the right.

**D**URING the middle of December, 1954, Cosby-Hodges Milling Company, Birmingham, Alabama, began operations in its new one and three-quarter million dollar feed plant.

This is one of the most modern feed processing plants in the South. The latest designs for automatic, speedy, accurate production were incorporated to create the highest possible efficiency in material handling and feed processing. The plant is of concrete and steel construction and is located on a 35 acre tract in the Acipco area. The mill, with six floors, rises 130 ft above the ground and adjoins a warehouse having 30,000 sq ft of floor space for storage of finished feeds.

The plant operates with a minimum dust problem as an extensive dust collecting system, which was fabricated and installed by the Day Company, was incorporated in the construction of the plant.

Weighing of ingredients and mixing operations in the mill are carried out automatically by a push button batch system using Fairbanks-Morse & Company scales and controls. These operations are elec-

tronically controlled from central control panels located on the first floor. The plant can produce up to 75 tons of feed per hour in any form, such as mash, pellets or crumbles.

### Receiving and Storing

In-bound grain and other ingredients come to the plant in bulk form by rail or truck where they are dumped into receiving pits, passed over a Starnes electric magnet to remove metallic objects, then carried on a Continental Gin Company drag conveyor to the elevator which lifts the ingredients to the sixth floor for weighing on Richardson scales and for cleaning.

The ingredient storage area consists of 34 bins with whole grain storage capacity of 69,200 bushels, or the equivalent of 35 railroad cars. The bins for soft feed ingredient storage have a capacity of 56

cars. These bins are 75 ft in height and 15 ft in diameter.

The grains and other ingredients go from the storage bins to various machines where they are processed and are then elevated by Continental Gin Company bucket elevator back to the top for storage in operating bins.

### Mixing

One of the most interesting features of the plant is the mixing operations after the various ingredients have been processed. This is controlled by two operators who are located in a central control room air conditioned by Carrier equipment. With the aid of 45 selector push buttons the operators weigh and mix the various ingredients going into the feed in conformity with the formula for the feed being produced.

**By E. D. SCOTT**

Division Power Sales Engineer  
Alabama Power Company  
Birmingham, Alabama

directional  
arrows

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MATERIALS  
HANDLING

Light,  
General  
and  
Heavy Duty  
**FREIGHT  
ELEVATORS**

**DUMBWAITERS**

**HOISTWAY  
DOORS**

**MODERNIZATION**

**MAINTENANCE**

**PASSENGER  
ELEVATORS**

*Otis*

### taking the extra stresses

Freight elevators need extra ruggedness of design to stand up under industrial power truck loading "punishment." The arrows in the diagrams at the left show how impact stresses vary when the elevator platform is level, below or above the landing. They also show the effects of a fast braking stop. These and the stresses of off-balance loading, and extra static loading are at work, not singly, but simultaneously and in endless combinations—as described in detail in Otis Heavy Duty Freight Elevators booklet B-705.

### simplifying multi-floor handling

Freight elevators can easily be made to step up the efficiency of floor-to-floor production lines. The same electronic skill that developed automatic operatorless AUTOTRONIC® elevators for busy office buildings is ready to make completely automatic freight elevators an integral part of vertical production lines. This thinking can be applied to new buildings, to new elevators for existing buildings, and to modernizing outmoded light duty, general duty and heavy duty freight elevators.

### time-saving hoistway doors

Otis power-operated bi-parting hoistway doors open while the car levels. This is a major time-saving feature. As compared with manual operation, automatic power operation is safer, quicker, smoother, and materially reduces round-trip time for busy freight elevators. The electric door operator does not depend on "coast" but drives the doors and car gates quietly to the fully opened and closed positions—as described in Otis Hoistway Doors booklet A-389 for new installations and modernization.

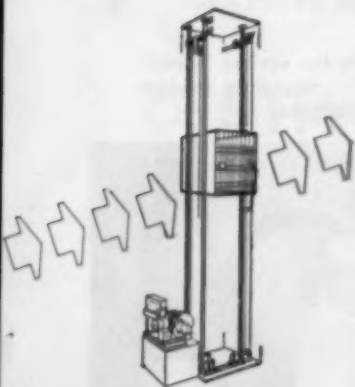
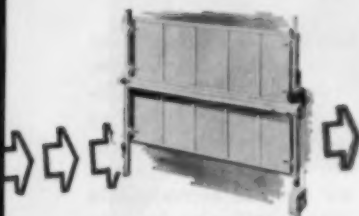
### save costly building alterations

Otis Light Duty freight elevators have a semi self-supporting framework that permits installation in new and existing hoistways without reinforcing the building, or adding overhead supports, or building a pent-house. They can be used for any rise up to 35 feet at a speed of 25 feet per minute with lifting capacities of 1,500, 2,000 and 2,500 pounds. They're described in Otis booklet B-720.

### value of a maker's pride

A perfectly performing installation is Otis' best salesman. That's why Otis maintenance is planned to keep elevators running like new—year after year! Preventive maintenance is engineered service by the maker that prevents slowdowns and breakdowns; extends elevator life by 50%; eliminates expensive, unexpected repair bills; keeps replacement parts readily available; and provides 24-hour-a-day service on a nationwide basis with factory-and-field trained men that have a knowledge of elevating that can't be matched.

**OTIS ELEVATOR COMPANY, 260 11th Ave., New York 1, N.Y.**  
OFFICES AND SERVICE IN 295 CITIES ACROSS THE U. S. AND CANADA



After the formula has been weighed out, the feed is then re-elevated to the top where it again passes over magnetic pulleys and scalpels, and then into a three-ton S. Howes batch mixer. Quality control is implemented by printing the weight of each ingredient on a Fairbanks-Morse tape automatically as it is weighed by the operator. This makes possible an accurate check on the formulation of each batch of feed.

In addition to the two S. Howes three-ton capacity mixers, an independent batch mixer is available for mixing small quantities or special feed formulations. It operates on the same basic principle as the larger units.

### Packaging

Due to the numerous sizes of packages handled by Cosby-Hodges Milling Company, many different types of packers are used, all of which are located on the first floor.

All the high molasses dairy feeds and horse feeds are packed on a Richardson Model GG38 combination molasses feed duplex sacking scale. Scratch feeds are packed on a Richardson Model FT Sacking Scale. The smaller packages of scratch feed are packed on an Etbauer duplex net weigher.

For packing dry mash feed, the following scales are used: one 50 and 100 lb combination Duplex Richardson Model GG38 Scale. For 25 lb sacks two Model E50 Duplex Richardson Scales are used, and in addition two Etbauer Duplex Net Weighers are used for packing 10 lb units. Pellets and crumbles are packed in a Richardson Model "Offft" Scale with an Etbauer duplex net weigher being used for packaging the smaller units.

### Sorting and Shipping

After feeds have been packed, they drop through an opening in the floor onto Continental Gin Company conveyor belts which collect the various sizes and items and carry them to sorting tables located in the center of the warehouse.

The feeds are then separated according to size and type and placed on pallets which are carried by Hyster gas propelled fork lift trucks to the storage area or to railroad



Sorting table and part of conveyor system where feeds are sorted, placed on pallets in 1-ton batches then transferred by lift fork trucks to storage or railroad cars or trucks for shipment.

cars or trucks for shipment. At the car loading dock, two rows of five cars each can be spotted at one time.

A modern one-story building cooled with York air conditioning equipment in summer and heated with steam from Dutton Econotherm gas fired boilers in winter located adjacent to the new mill,

contains the general offices of the company's four-state operations. Demonstration and testing facilities, which will include numerous types of livestock as well as poultry projects, are located on the premises. An air strip to accommodate company planes will also be constructed on the mill site.

Central control room where two operators mix the various ingredients which go into the feed by operating the necessary selector push buttons in accordance with the desired formula.





what are good little  
Yarway Impulse Steam Traps  
made of?



## STAINLESS STEEL, of course

Body and all internal parts of YARWAY Impulse Steam Traps are of *stainless steel*—one of the biggest steps taken by any trap manufacturer to increase trap life and reduce maintenance.

Other YARWAY Impulse Steam Trap features:

- Gets equipment hot in a hurry—and keeps it hot.
- Good for all pressures without change of valve or seat.
- Easy installation—small size, light weight.
- Non-freezing at low temperatures.
- Six standard sizes, 1/2" to 2".

Want proof of performance? Try a YARWAY Impulse Trap and Fine Screen Strainer FREE for 90 days in your own plant. For free trial or free Trap Selector, write . . .

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**YARWAY**

**impulse  
steam trap**

## ADVANCEMENTS in the Power Field

**T**ECHNICAL editors were recently invited to see advanced studies being conducted at the Research Center of Babcock and Wilcox Company. While important research is centered on atomic power and extremely high pressures and temperatures—improvements in more conventional methods of power production are not being neglected.

The following is a brief summary of investigations now being conducted:

..... Atomic Power  
..... Welding  
..... Fuels  
..... Steam Cleaning  
..... Corrosion

**B**OTH high-pressure water-cooled reactor systems and liquid-metal-cooled reactor systems are being investigated in the atomic energy section. On the water-cooled system, studies are being conducted on heat transfer, the corrosion of various stainless "structural" alloys and the corrosion of fuel element cladding materials. Carbon steel and other economically available materials of construction are also currently being investigated for possible use in commercial power reactor plants.

Recent achievements in the control of silica carry-over in boiler steam have been made. Equipment for removing silica from steam is now being built as a result of data collected.

The Creep and Stress Rupture Laboratory at the Babcock & Wilcox Research Center comprises 136 stations where tests are conducted to investigate the longtime behavior of alloys under conditions of stress and high temperature.



Testing and design problems in the fields of electronics, stress analysis, fluid flow and heat transfer are being tackled.

During the development of B&W's 5500 psi supercritical pressure boiler, the research group was called upon to determine stresses in the headers at pressures up to 30,000 psi.

A coordinated program for melting, casting, forging and machining new metal alloys has been worked out at the Research Center.

Welding equipment for a new automatic submerged arc process that deposits metal five times faster than present automatic welding processes is undergoing test and development. New welding metals for use in the atomic field are also being investigated.

Tests are being conducted on new metal alloys for use in tubes for superheaters, with the intent of ultimately developing tubes for use at higher temperatures and pressures than are possible today. The research center is believed to include the largest creep laboratory in the world.

Data on the mechanical properties of metals at low and high temperatures, besides information on strength, ductility, toughness and shock- and impact-resistance is being gathered.

Research has resulted in such diverse products as insulating material for jet engines and high-temperature concretes. To conduct this research, B&W had first to design and build many of its own special devices for testing these refractories.

Steam contamination is being studied in the chemical laboratory. It is, for example, essential to know what materials, such as silica in quantities as small as 0.001 ppm., are in steam generated in the new Universal Pressure boiler. The 50 employees in the chemical laboratory comprise the largest group at the research center. They handle all B&W chemical

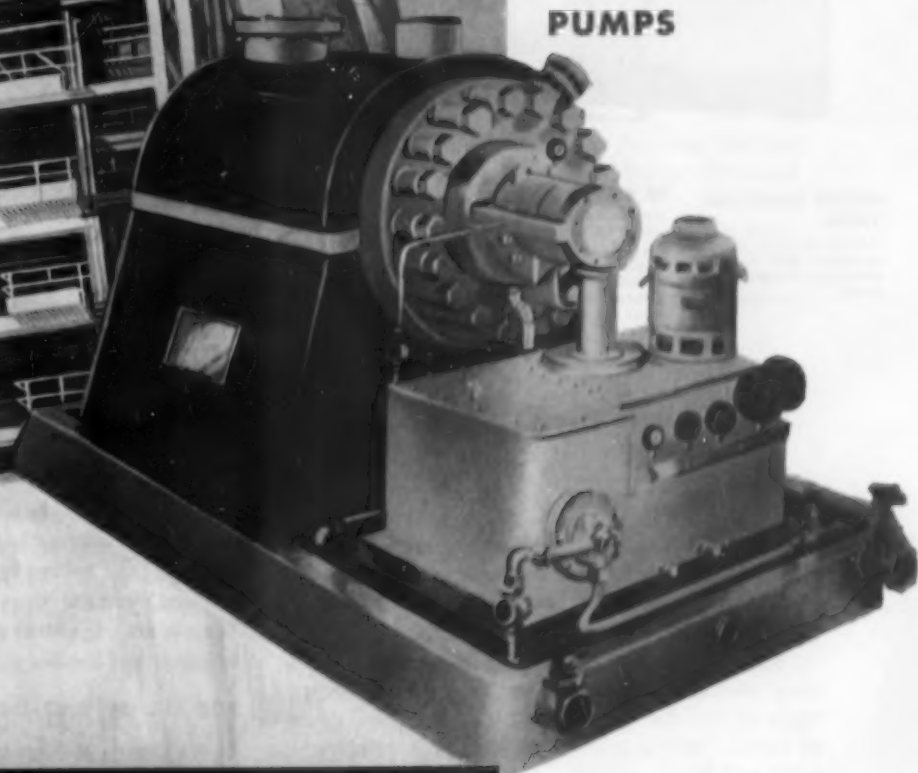


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#### OIL VOLUMETER

Variable positive-displacement pump submerged in the oil reservoir. Meters by volume the exact quantity of oil needed for varying loads.

#### CONTROL PANEL

All combustion controls completely assembled, wired and tested at factory. Fully enclosed in a single control panel for protection from dust and damage.

#### FORCED DRAFT FAN

Eliminates need for a high stack, by furnishing positive, regulated supply of combustion air. Ruggedly built; easily accessible for inspection.

#### VENTURI COMBUSTION THROAT

Pre-cast refractory chamber is integral part of burner; eliminates on-the-job brick work.

#### OIL HEATING SYSTEM

Automatically keeps heavy oils at the correct temperature for most efficient combustion. Heater is tubular multiple-pass type; with temperature control instruments and necessary valves.

## Perfectly balanced firing

### IT HAS TO BE PLANNED

Iron Fireman firing systems are available as complete package boiler burner units of the type shown above, or as separate package burners for installation in your present boilers.

No mere conversion burner, these package burner units contain every component for balanced firing: single or dual-fuel systems and burners, forced draft air supply, built-in combustion refractory, completely wired and tested controls.

Iron Fireman burner units are carefully assembled and tested at the factory. This means the kind of continuing dependability and operating efficiency seldom achieved with local assembly.

### INSTALLATION SAVINGS, TOO

Long-range savings should be the main consideration in your choice of a firing system. But don't overlook

the *installation savings* that you can also make with an Iron Fireman package burner. There's little more involved than bolting to the boiler front, and making fuel and electrical connections. Iron Fireman package burners are engineered for firing practically all types of steam and hot water boilers.

### FOR OIL OR GAS, OR BOTH

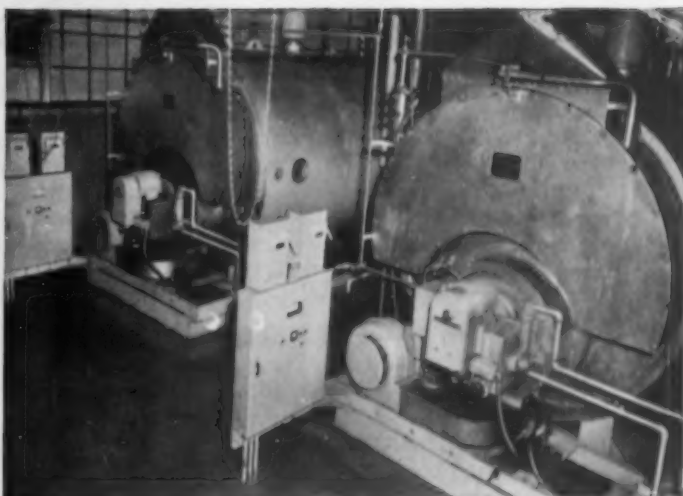
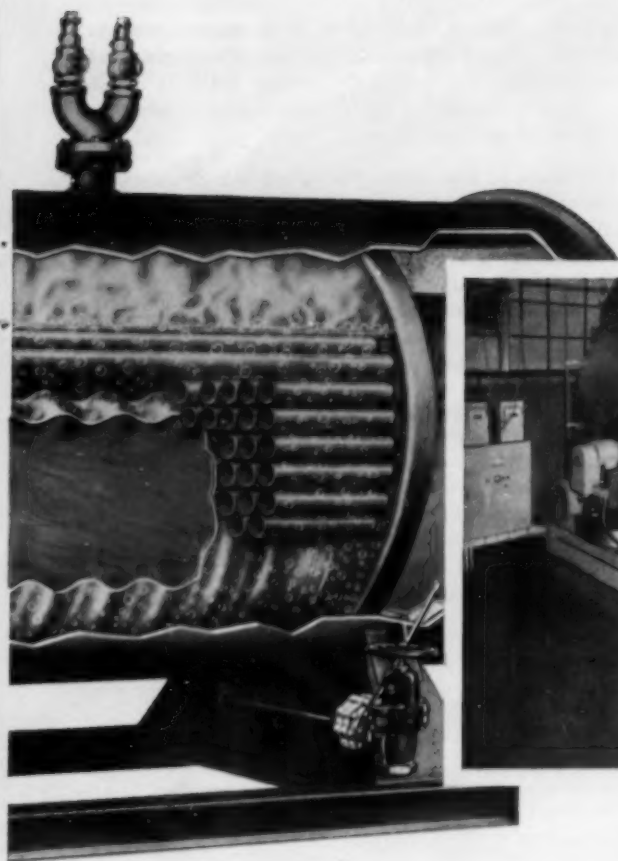
Iron Fireman package burners with dual-fuel systems



# Iron

OIL, GAS OR COAL





**DeVilbiss plant finds that Iron Fireman complete fuel burning systems provide higher efficiency, greater cleanliness**

This photograph of the DeVilbiss boiler room at Barrie, Ontario, Canada, shows two Iron Fireman boiler-burner combination units installed there last year. Officials report performance has been highly satisfactory. Installation was made by Tewes Engineering, Toronto, Ontario.

## is no accident . . .

can bring greater economy to your operations in two important ways. First, you can take full advantage of seasonal fuel price cuts. And second, in event of emergency fuel shortages you can rapidly switch over *without* expensive shut-downs. Controls are actually changed from one fuel to another with just the flick of a switch!

Gas of any type is effectively burned with the Iron Fireman ring type gas burner. And the horizontal

rotary oil burner, shown above, brings you steady and economical power with heat-rich heavy oils.

### GET COMPLETE INFORMATION

Fuel savings . . . installation savings . . . dependable long-range operation. Certainly these features belong in *your* plant.

For complete technical information on the Iron Fireman package burner, send the coupon.

# Fireman®

**FIRING FOR HEATING, PROCESSING, POWER**

IRON FIREMAN MANUFACTURING CO.  
3031 West 104th Street, Cleveland 11, Ohio.  
In Canada, write 80 Ward Street, Toronto, Ontario.  
Please send detailed information on Iron Fireman  
package burner units for oil, gas, or oil-gas dual firing.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

problems and, in addition, perform service functions for other B&W departments and for customers.

The mechanism of **corrosion** on both the water side and the fuel side of boilers is always under investigation in the chemical laboratory, as well as corrosion problems of the pulp and paper industry. Methods of corrosion prevention are constantly sought.

Still another phase of the chemical laboratory's work is **fuels research**. Values of fuels are determined, and the constituents of coal and oil investigated. Tests of oil and gas heat inputs up to 185,000,000 Btu per hr are being made here.

In a special closed-loop pilot unit, experiments are being conducted that are expected to lead to the optimum **arrangement of tubes** in a boiler. Steam can be generated, separated from water, condensed, and circulated under close control. From this special unit, B&W researchers are getting information on **operating limits** to aid boiler designers and service engineers.

Data on the **behavior of steam** at pressures up to 5,000 psi is being gathered in a small pilot plant, which comprises a single-tube steam-generator with separately fired superheater. In this unit, pressure drop, heat transfer and feedwater characteristics

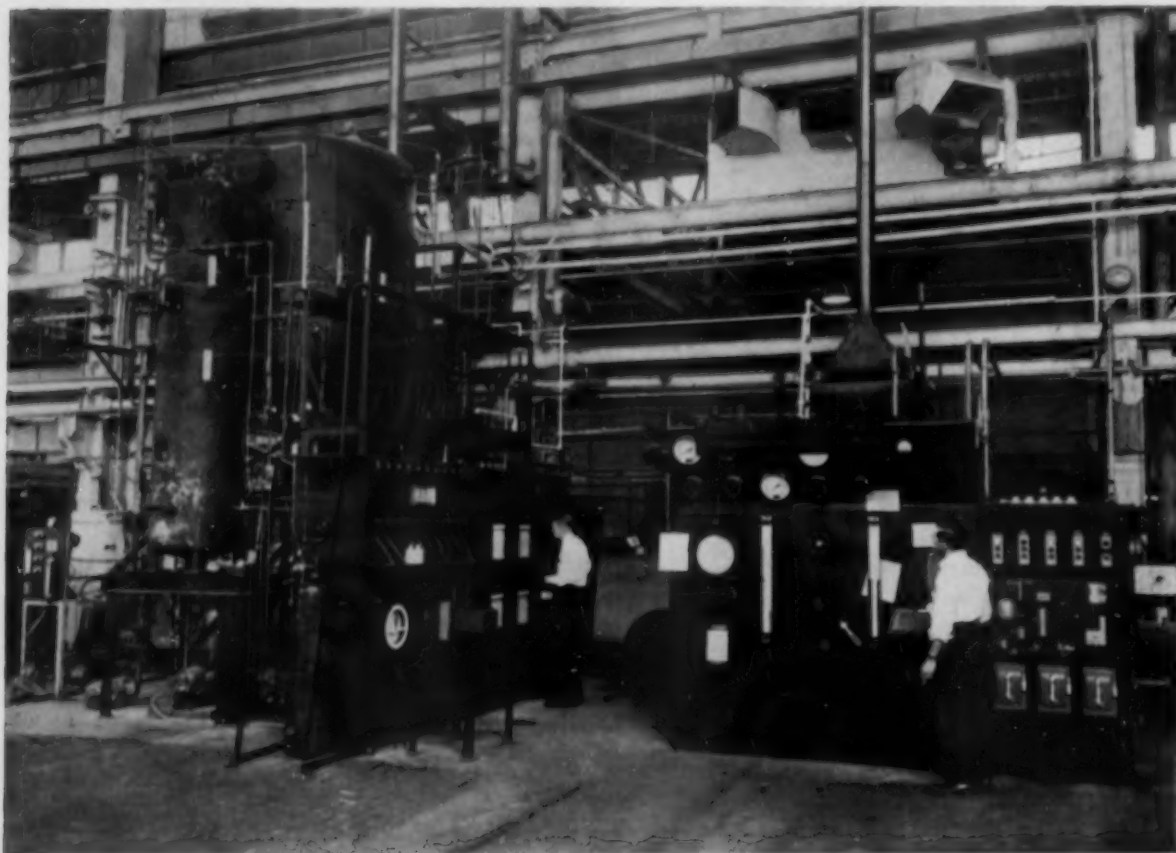
are being studied. Results of tests made here are embodied in the design of the new Philo plant of American Gas & Electric Co., which B&W is building. It will operate with an outlet steam pressure of 4,500 psi at 1,150 F.

Solutions to the problems of **effectively burning** petroleum coke and other low-grade fuels are being worked out in a cyclone furnace laboratory. To overcome the nuisance of fly ash and make possible the efficient burning of low-grade fuels high in ash, B&W researchers are experimentally burning different grades of coal, coke breeze, petroleum coke, anthracite, lignite and oat hulls in a 5-ft cyclone.

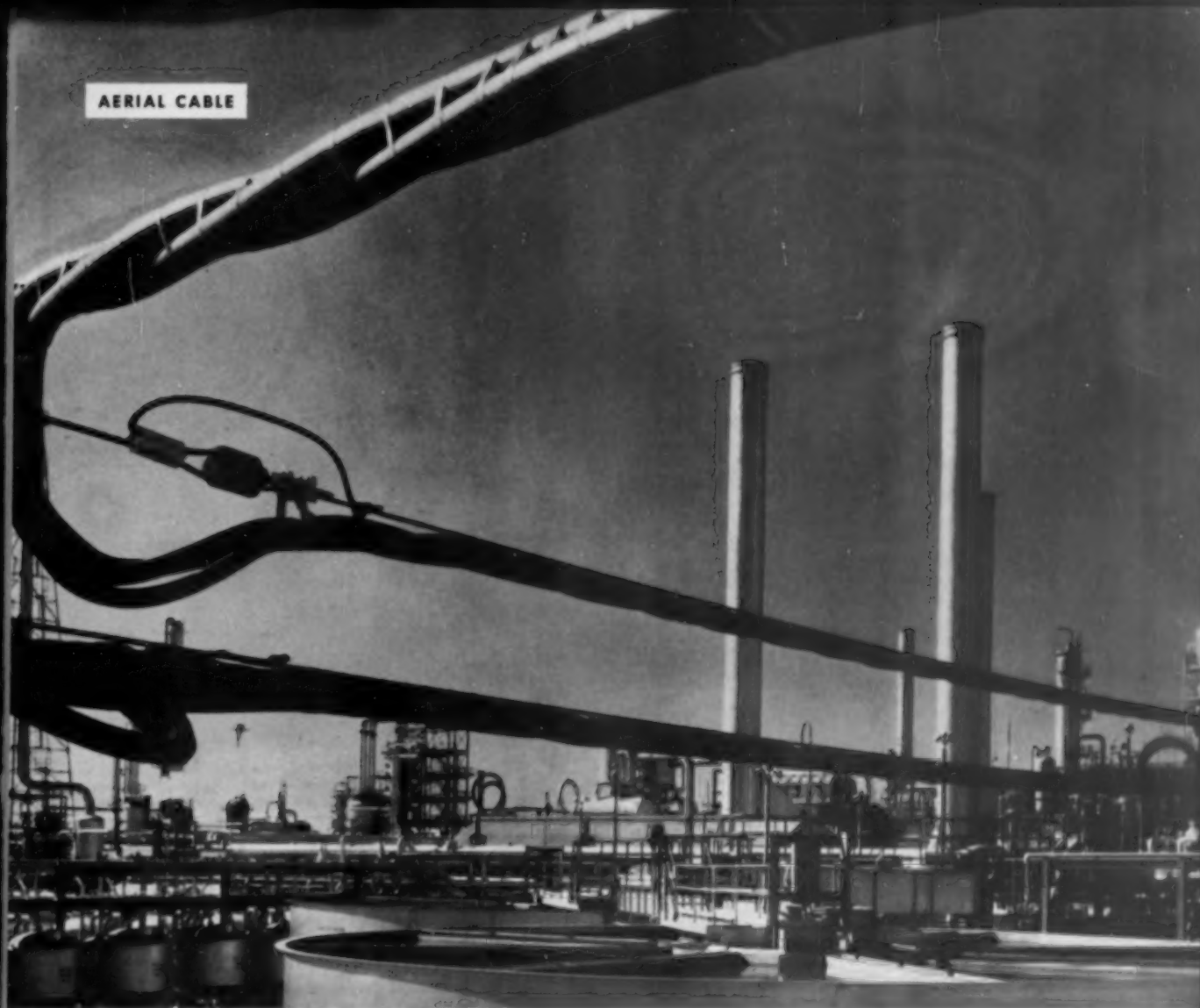
This small completely water-cooled unit is being used for exploratory research to improve over-all design and find new applications for **cyclone burners**. Fuel particles are held within the cyclone by centrifugal force induced by preheated combustion air entering the cyclone at over 200 mi per hr. This causes extremely rapid burning at flame temperatures approaching 3,200 F.

Residual carbon-free ash melts and flows into a slag tank where it is quenched with water. In this way, about 95% of the ash from the burning fuel is collected within the cyclone furnace.

This above-critical Test Unit at the Babcock & Wilcox Research Center provides a means for investigating conditions that exist in a boiler operating at pressures above the critical pressure barrier. It is especially adapted for the investigation of problems associated with heat transfer, pressure drop, and feedwater requirements.



AERIAL CABLE



NEITHER STORM NOR HEAT NOR CORROSION knocks out ANACONDA's 3-conductor 15kv self-supporting Aerial Cable—shown here at Shell Oil's modern new refinery at Norco, La.

## GO UP TO BRING COSTS DOWN

—with Anaconda Aerial Cable

When new power is needed or when old circuits must be replaced quickly and at low cost—more and more plants are turning to ANACONDA Aerial Cable.

In plants where the maze of pipes and other underground structures often make installation of ducts or buried cable costly or difficult. This

cable solves the problem.

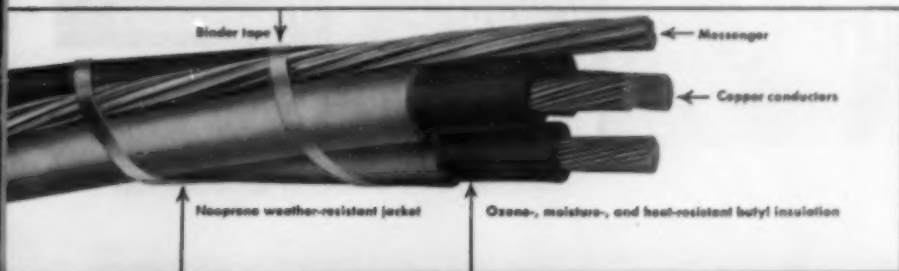
It's fast, easy to install—particularly in crowded areas. No special ducts or crossarms or insulators are needed. Even in open areas, this rugged, neoprene-jacketed cable costs much less than buried systems.

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Today's finest aerial cable! Type AB butyl insulation gives ANACONDA Aerial Cable the finest performance record. For the full story, call the Man from Anaconda today. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

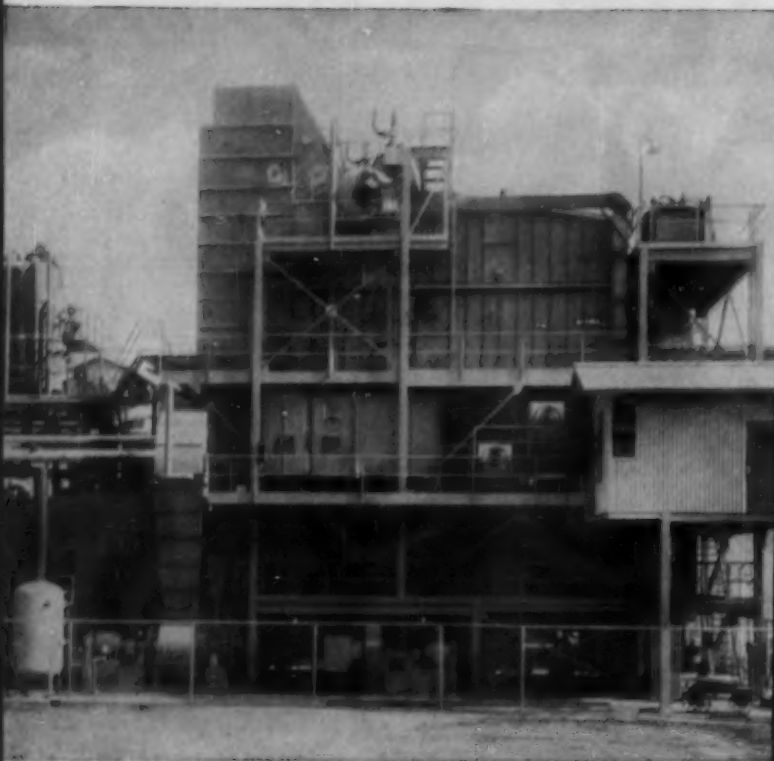
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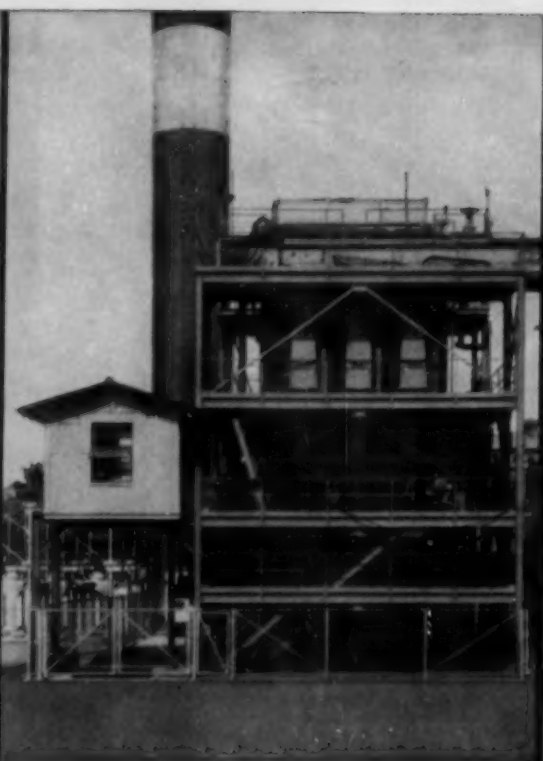
Ask the Man from

**ANACONDA®**  
about your

**High-voltage Aerial Cable**

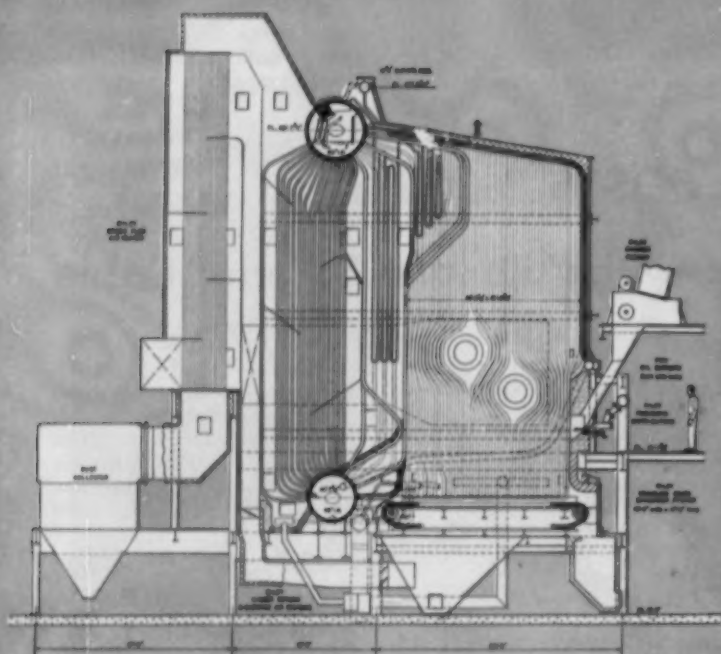


1. Everything outdoors; small house is the control room and shelter for operators. Auxiliary oil burners can be seen at left of house.



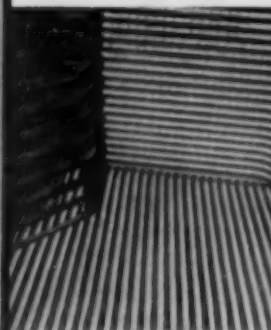
2. Front view illustrates compact arrangement of bagasse burning equipment: bagasse conveyor, feeders, pneumatic distributors, stoker, ash hopper.

## A typical RILEY Steam Generating



Hawaiian Commercial & Sugar Co.  
Puunene, Maui, T. H.  
Bechtel Corporation, Consulting Engineer

Capacity 125,000 lbs/hr rated on Bagasse  
900 psig — 760 F.  
Riley Traveling Grate Spreader Stoker  
Three Riley Pneumatic Refuse Fuel  
Distributors  
Three Riley Refuse Fuel Feeders  
Four Oil Burners  
Overfire Air System  
Complete Automatic Combustion Controls

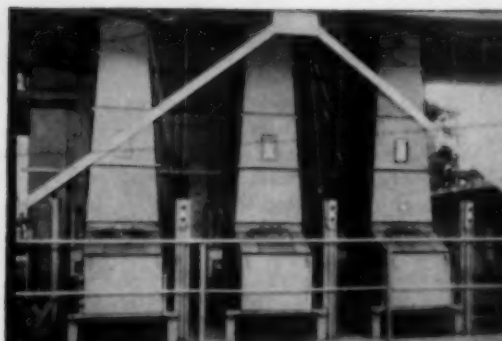


Partial view of furnace illustrates water-cooled slag screen, roof and side wall.

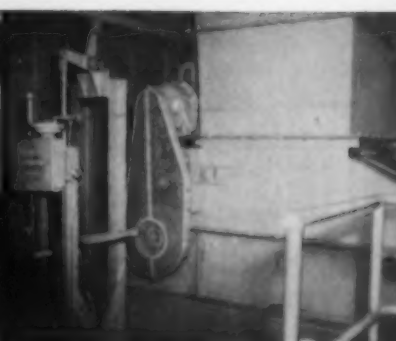


Compact Riley Hydraulic Drive powers Riley Traveling Grate Stoker smoothly.





3. Three Riley Refuse Fuel Feeders with individual controls and storage hoppers.



4. Combustion controls regulate feed rate with load demand.



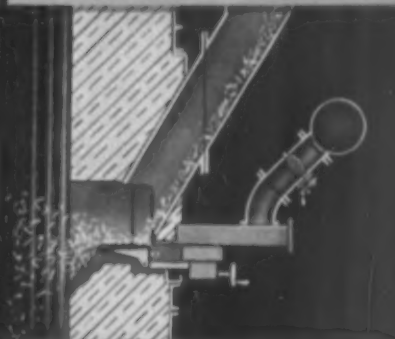
5. Chain type feeder carries bagasse forward where it is shredded by conditioner roll.



6. Three Riley Pneumatic Distributors are simple in design and easy to regulate.



7. Pneumatic Distributors have no moving parts for stringy refuse fuels to wrap around or clog.



8. Bagasse falls to tray of distributor where air jet propels and spreads it uniformly over grate surface.

## Unit for Burning Cellulose\* Fuels

\*Bark, Bagasse, Wood Chips, Sawdust, Hogged Wood, Salvage, Rice Hulls, Sisal

Modern methods and equipment in the production of steam are as important to year-end profits as any phase of the production process. In the sugar industry progressive, cost-conscious companies, such as Hawaiian Commercial & Sugar Company, are adopting the most efficient equipment available to them for the burning of bagasse, the sugar industry's combustible cellulose waste fuel. Riley's equipment makes steam production

almost completely automatic, permits continuous uninterrupted operation throughout the production season, and assures low cost, dependable and efficient operation.

Whether your steam capacity and pressure requirements are large or small, Riley's refuse burning system can be tailored to your needs. Ask your Riley representative for complete information about Riley's refuse burning equipment.



A survey of your plant by a consulting engineer could show ways of making surprising savings in your power costs.

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### REPUBLIC OF THE PHILIPPINES

Atlantic Gulf and Pacific Co.  
of Manila  
Robert Dollar Building  
Manila, Philippines



Running trucks over the uneven wood flooring (left) worked the nails loose so they protruded and damaged truck tires. Breakage of planks also wrecked the loads and caused injuries. Heavily loaded lift trucks now glide over the Tri-Lok flooring (right) so smoothly that the wet clay forms remain in perfect upright shape for drying.

## STEEL GRATING FLOOR CUTS MAINTENANCE COSTS

By J. F. BAILEY, General Manager, Texas Vitrified Pipe Company, Mineral Wells, Texas; and F. S. TRUMBOWER, Dravo Corporation, Pittsburgh, Pa.

**Maintenance Improvement  
Accompanied by Better Production — Texas Pipe Plant**

**R**IDDING its ceramic drying room floors of protruding nails, broken planks and uneven surface is paying dividends to the Texas Vitrified Pipe Company, Mineral Wells, Texas, in less truck maintenance, fewer tile rejects, elimination of accidents and more economical drying. These benefits were secured by replacing the old wood flooring with Tri-Lok steel grating.

The old floors, consisting of 2 x 4's spaced about  $\frac{1}{2}$  in. apart on 2 x 12 in. joists resting across brick subwalls, were constantly giving trouble. Drying out of the lumber and the constant movement of the heavy lift trucks caused the nails to work loose and protrude above the surface. They, in turn, cut and tore pieces of tread from the truck wheels throwing them out of round, which added to the thumping and bumping.

The bumping worked the nails higher, and also caused the newly formed clay pipe to slump and become worthless. Wheel repair alone averaged a tire retread a week at a cost of \$17 each.

Added to troubles just men-

tioned were (1) unexpected floor breaks, which spoiled the truck load of material and sometimes injured the operator, and (2) constant plugging of the spaces between planks, which seriously interfered with air circulation.

These problems were licked so effectively in one room fitted with Tri-Lok grating that two more were refloored. Design of the flooring is based on a pallet-truck gross load of 5500 pounds.

The brick subwalls were replaced with 8 in. wide flange girders on 10-ft centers to support 7-in. channel-iron cross beams on 28-in. centers. Across the channel-iron beams rest 2 x 20-ft panels of  $1\frac{1}{2}$  x 3/16-in. Tri-Lok panels. Besides being welded to the beams, adjacent panels are fastened together through their outside bearing bars by tie bolts. One end of each panel is banded to prevent telescoping at abutting joints.

Tying the panels together makes a smooth continuous bearing surface that distributes the load and prevents jar and vibration as the truck wheels pass panel joints. The only exception

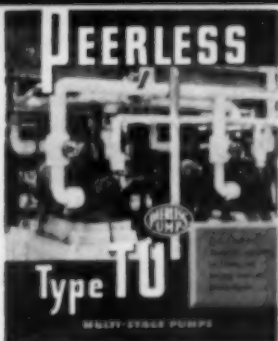
is one panel in each bay which is fastened with clips to permit removal for steam piping inspection.

### Many Advantages

Besides serving as a long lasting and structurally secure surface for truck movement, the steel grating floor provides these economic advantages: (1) A 50% reduction in drying time with a consequent reduction in fuel consumption; (2) A 90% free opening for hot air movement and more clearance for clay droppings; (3) No slumping of the wet clay forms during transportation into the drying rooms; (4) Better heat circulation; (5) Reduced fire insurance premiums; (6) Personnel hazards eliminated; (7) It is much easier to cool down the dryers so the men can get in to remove the tile.

In addition to these improvements, drying of the tile is more uniform and its moisture content is nearer the optimum value for firing which prevents blistering. Furthermore, the smooth floor does not damage the lift truck tires.

# either way YOU LOOK AT THE PUMPING PROBLEM



## Horizontal

## VERTICAL



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FOOD MACHINERY AND CHEMICAL CORPORATION

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Phoenix; Fresno; Los Angeles; Plainview and Lubbock,  
Texas; Albuquerque, New Mexico.

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### PERFORMANCE-PROVED PEERLESS PUMPS WILL DO THE JOB BETTER

*Here's why*—You can choose from either Peerless vertical or Peerless horizontal designs for most every liquid transfer job—water or process liquids. You can select the pump you need from the broadest range of heads, capacities and horsepower.

You can buy and apply a Peerless pump with the confidence that it will provide dependability over the years.

Bulletin B-1700, at the top above, describes Peerless vertical can type process pumps. Bulletin B-1400 just above describes multi-stage horizontal pumps for high pressure liquid transfer.

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## DEMINERALIZATION—Economical and Dependable

A GOOD example of the trend toward tailored water for industry can be seen at General Electric Company's Appliance Park in Louisville, Kentucky. At this installation, the largest, newest appliance manufacturing center in the world, G-E will be turning out all of its major appliances. In a plant of this type, high purity water is essential to turning out products with a high-quality finish and in keeping down costly rejects.

There are two ways of producing water which has a low mineral content—distillation and demineralization. For an important one of a number of key water treating stations at the giant plant, General Electric Company chose an automatic demineralizer manufactured by the Penfield Manufacturing Company of Meriden, Connecticut.

The demineralized water is used: (1) to wash refrigerator and freezer cabinets with an alkali water solution and then to rinse them prior to the application of a porcelain enamel finish; (2) in the milling of the frit which becomes the final finish when baked on the cabinets; (3) in anodizing certain parts.

### Advantages

The advantages of demineralized water (less than 5ppm  $\text{CaCO}_3$ ) are these:

1) Without water of this degree of purity, color control in the many different colors currently used on GE appliances would be impossible. Similarly, any anodizing operation would be imperfect and troublesome because of metallic deposits and discolorations.

2) Less cleaning solution is required and that which is used does a better job since no precipitate (ordinarily formed by impurities and cleaning compounds) is left on the ware.

3) Without deposits on the metal surfaces, the final finish (which is

put on in three coats) forms a better bond.

4) Complete quality control is possible in the mill room since the water purity is a known and unvarying factor.

5) Costly buffing operations necessary for removing water spots are eliminated since there are no such spots left with demineralized water.

At Appliance Park, demineralized water was chosen over distilled because it is cheaper. Demineralization with the latest available resins removes all types of impurities, ionizable and non-ionizable, including minerals, organic gases and bacteria. All trace metals such as sodium, potassium, calcium, magnesium, iron, copper, etc., are effectively removed along with all salts such as sulfates, carbonates, bicarbonates, chlorides, etc.

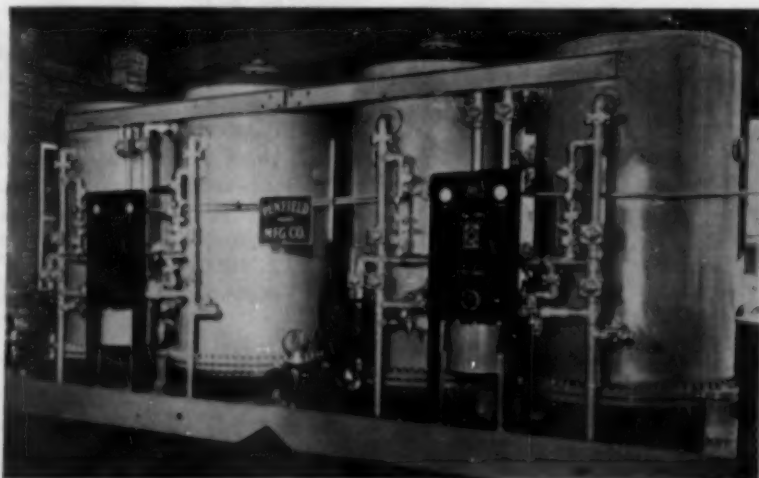
All of this is done in the Household Refrigeration Department's central water treating system which includes, among other standard equipment, twin Penfield deionizer units, each with a capacity of 60 gpm. These demineralizers serve both the refriger-

erator unit and cabinet buildings. City water used at the plant comes originally from the Ohio River and is likely to be unpredictable, running very hard at certain times of the year.

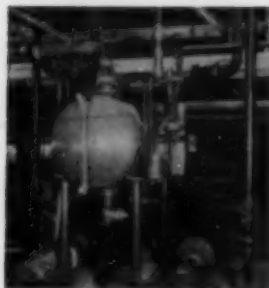
These demineralizers perform all their operating functions, including the regeneration cycle, completely automatically. Once the unit is put into operation, there are no valves or switches to operate and minimum supervision is required. Whenever the effluent's conductivity falls below standard, the treated water is automatically discharged and a regeneration cycle is automatically actuated. During the regeneration cycle, the regenerative tanks are automatically refilled with water so that fresh acid and caustics may be added in preparation for the next regeneration cycle.

Costly and time-consuming errors that occur in the manual operation of regeneration cycles are avoided, desired high purity of the effluent is an automatic certainty, and operating costs are cut to a minimum.

Each unit has a rated capacity of 3,600 gph and performs all its operating functions, including regeneration, automatically.







Wrought iron pipe serves condensate pump battery



8" wrought iron condensate overflow line in boiler room



Wrought iron steam return on trestle between buildings



Welding elbow on 10" wrought iron condensate line



10" wrought iron condensate lines in boiler room

## In its new Appliance Park, GENERAL ELECTRIC assigns WROUGHT IRON PIPE to corrosion "HOT SPOTS"

Quality—a key word in the planning, designing, and manufacturing of General Electric appliances—is also a basic Company consideration in the application of wrought iron in their new Appliance Park, near Louisville, Kentucky. More than 359 tons of this time-tested material was used to safeguard against corrosion in exposed water lines and steam return lines in all of the five buildings in the plant plan.

**Architects and Engineers**—Fairbrother-Miehls, Detroit, Michigan; Albert Kahn, Associated Architects and Engineers, Inc., Detroit, Michigan.

**Consultants**—Eggle-Furlow, Philadelphia, Pennsylvania.

**General Contractors**—Turner-Strock Construction Company. **Plumbing**—Standard Engineering, George Blanford, Louisville, Kentucky.

**Heating & Piping**—Kerby Saunders, New York, New York; Meyer Ward, Louisville, Kentucky.

Our bulletin, *Piping for Permanence*, discusses these, and many other proved wrought iron pipe services. Write for your copy.

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**WROUGHT IRON**  
TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY STEEL PRODUCTS



WHEN SPEED'S THE NEED, this chart and accompanying plant diagram save countless steps and minutes. The diagram shows routes of air, gas, water and steam mains in the TEMCO Dallas, Tex., plant. The chart shows locations of shut-off valves. In event of emergency maintenance crews can halt flow of services to an endangered area immediately.

## SHUT-OFF CHARTS SERVE TEXAS PLANT

**I**T PAYS to learn your battle stations before you have to use them.

That's the thought behind an example of preparedness recently posted on a bulletin board in the Maintenance Department at Temco Aircraft Corporation.

The poster is a diagram of all air, gas, water and steam mains in the 1,200,000 sq ft Dallas, Tex., plant. Also marked on the diagram are the locations of all valves, pressure relief valves and meters.

These shut-off stations would be key points in event of an emergency such as fire, flood, freeze, or enemy action. Posted in the Maintenance Office, they can be scanned quickly by the shift maintenance foreman, the man responsible for overseeing plant utilities.

Alongside the diagram are two charts, one of which is titled "Shut-Down Information Sheet." This chart lists and describes each

building in the plant; lists the types of service found in each building (gas, air, water, etc.); locates valves inside and outside the building which control the flow of services to the building.

This chart would guide utilities shut-down in case of fire or other disaster.

The second chart lists—by building—all water supply valve and drain valve locations. This chart becomes the maintenance foreman's check list when a sharp freeze is predicted.

There's very little described on the charts that isn't diagrammed on the poster, admits Temco Maintenance Superintendent C. G. Housewright. "But the charts give the foreman a quick word picture of what he has to know to take immediate action.

"For more prolonged reference, such as tracing a water main, he can refer to the plant diagram."

Charts are concise, but they contain all information needed by the plumber or electrician dispatched to find a critical valve or switch.

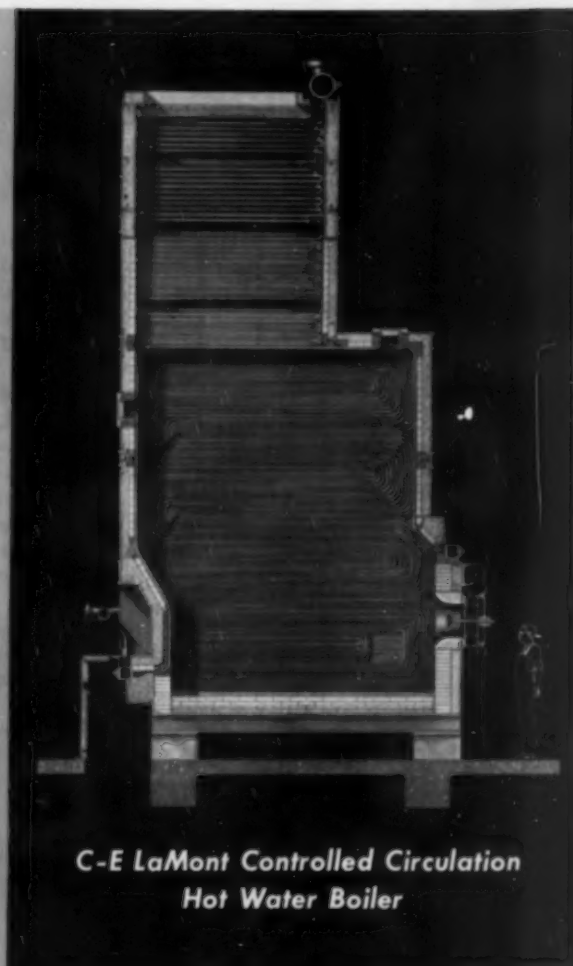
For example, the position of a 4-inch air valve in Building X is described as "inside the north wall of Building X, 100 ft from NW corner, 2 ft above floor, near Column YG-28."

Other important details necessary for a rapid shut-down also are mentioned. This note, for example:

"These two air valves are parallel with each other and both must be closed in order to shut off air for Building C."

This kind of pre-planning enables the foreman to brief and dispatch crews in seconds.

By reaching their battle stations on time, according to Housewright, maintenance crews have their battle half-won.



**C-E LaMont Controlled Circulation  
Hot Water Boiler**

## EVER CONSIDER HIGH TEMPERATURE WATER FOR YOUR HEATING AND PROCESSING NEEDS?

Both steam and high temperature water have their place, and your particular requirements will determine which is best for you. In either case the complete C-E line includes a type and size of boiler exactly suited to your requirements. Where high temperature (HT) water seems indicated, it affords such important advantages as:

1. The higher available heat in HT water...many times that of steam at the same pressure.
2. Closer control of temperatures throughout the system.
3. Heat loss is minor with the HT water closed system...no condensate losses...unused heat returns to the boiler.
4. No elaborate feedwater treatment required because make-up requirements are small.
5. No steam traps are needed, which means elimination of all trap problems and attendant expense.
6. No blowdown losses...no safety valve vent losses...no condensate return lines.

The planning of any new heating and/or processing system should give proper consideration to the suitability of the HT water system. There are many hundreds of HT water installations operating abroad and a rapidly growing number in the U.S.A. It may be *just right* for your requirements.

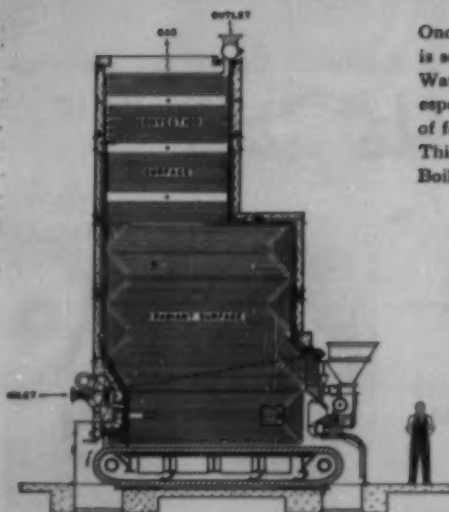
### *Advantages of the C-E Hot Water Boiler*

Once it is established that HT water is right for your needs, your next concern is selection of proper equipment. The C-E LaMont Controlled Circulation Hot Water Boiler has inherent advantages that make it the best possible choice. It is especially designed for HT water applications utilizing as it does the principle of forced, controlled circulation which is extended throughout the entire system. This accounts for numerous points of superiority in the C-E LaMont Hot Water Boiler. Among these are:

1. Complete control over HT water movement in both system and boiler.
2. Low pressure loss is inherent so no separate boiler pump is required.
3. Pressurized operation with oil or gas means no induced draft fan—simple stack.
4. Single-pass design—no baffles...low draft loss...cleaner boiler.
5. More efficient heating surface can be arranged because of positive, controlled circulation.
6. Other features such as: steel enclosed setting—few headers, all accessible—any fuel, oil, gas or coal.

The C-E Hot Water Boiler is available in sizes ranging from 15 to 300-million Btu per hour, or more, with pressures up to 300 psi and temperatures to about 425 F.

If you are in the market for a heating or process system—or expect to be—by all means investigate high temperature water and the C-E LaMont Hot Water Boiler. Our engineers will be pleased to discuss the subject with you or your consultants. Write for our new catalog HT-147.



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# New Reactors Cut Atomic Power Costs

By **JOHN F. LEE**

SP&I Consultant on Atomics and  
Professor of Mechanical Engineering  
North Carolina State College  
Raleigh, North Carolina

**T**WO new types of nuclear reactors have been developed and are ready for production. Both reactors represent a big step toward the production of electrical energy in atomic power plants at a cost competitive with a large number of modern conventional power plants. One of the reactors is of the boiling type and is being built for the 180,000-kw atomic power plant of Commonwealth Edison Company located in Grundy County, Illinois. The other reactor is available from Foster Wheeler Corporation and is of the homogeneous fast-breeder type.

## General Electric Reactor

It was long felt by engineers and physicists that the "boiling water" reactor was not feasible until such a reactor was pioneered by Dr. W. H. Zinn and his associates at Argonne National Laboratory. In the boiling water reactor the water, which is used as a coolant for the reactor and as the working medium in the power plant, is generated into steam. Heretofore, it was thought that the water would have to be kept in the liquid phase while in the reactor and, as a result, extremely high pressures, of the order of 2000 psi had to be used. After leaving the reactor the pressurized water was used to generate steam at 500 psi for the turbine.

The new General Electric Reactor is a true steam generator in which the thermal energy of nuclear fission is substituted for the heat released by combustion in the ordinary reactor. Because of the more reasonable pressures in this type reactor the cost is reduced since the reactor is much smaller and less costly construction mate-

rials are required.

Among the advantages of the new reactor are: (a) good thermal efficiency, (b) high degree of safety, (c) flexibility of operation to meet power demand changes rapidly, and (d) self-stabilizing power level to match load variations.

## Foster Wheeler Reactor

The aqueous homogeneous fast-breeder reactor developed by Foster Wheeler Corporation permits reduced costs for entirely different reasons than those of the General Electric reactor.

In the Foster Wheeler reactor a solution of uranyl sulphate in heavy water is contained in a spherical core in which the fission of Uranium 235 generates the heat required. The fuel, since it is in an

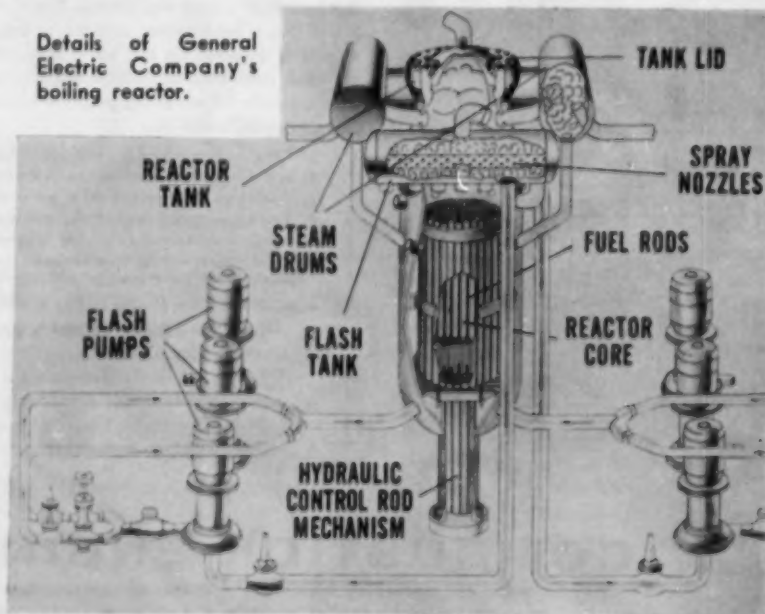
aqueous solution, can be pumped through the reactor core and fed to steam generator heat exchangers. The possibility of pumping the fuel charge greatly reduces the cost of fuel handling equipment.

The reactor core is surrounded by a blanket of fertile material, such as Thorium 232, which is converted to Uranium 233. The uranium produced in the blanket is used to refuel the reactor and heat is released in the conversion process to supplement that produced in the reactor core.

The core material can be reprocessed in the power plant as a relatively simple and continuous process. The blanket material must be reprocessed periodically at a Government facility but the fuel produced makes the arrangement very attractive from a cost standpoint.

Among the advantages of the Foster Wheeler reactor are: (a) simplicity of operation, (b) accessibility of equipment, (c) minimum maintenance, and (d) absence of excessive radiation hazard when repairs are necessary.

Details of General Electric Company's boiling reactor.





here's how  
high temperature  
piping  
can flex  
its muscles



Each pipe hanger is scale tested to rigid tolerances by a skilled workman at the Navco plant. After final assembly and inspection, the hangers are carefully crated and readied for shipment.



## NAVCO *Counterpoise* Pipe Hangers

Since high temperature piping has no respect for equipment connections, the entire piping system must flex its muscles to absorb the strain of expansion and contraction. This prevents serious stresses that could endanger the installation.

And how does high temperature piping flex its muscles? With Navco's precision engineered Counterpoise Pipe Hanger—the hanger with a load-supporting effort that is of constant value throughout the range of travel. This permits weightless movement of the entire piping system.

To learn how power plants, oil refineries and chemical plants can have piping systems that flex their muscles, write today for Navco's 12-page Counterpoise hanger bulletin #153.



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# COMPREHENSIVE TRAINING PROGRAM FOR POWER PLANT PERSONNEL . . . . .

By HAROLD GRASSE\*

Project Engineer  
Black & Veatch, Consulting Engineers  
Kansas City, Missouri

*This paper describes an extensive training program for power-plant operators and includes its organization, the preparation of operating instructions, and the methods used to teach the subjects in the classroom and during start-up. Operators having limited experience in existing stations were trained in eight months to operate a new unit plant. Their level of proficiency after this training was equivalent to, and perhaps greater than, that which they might have attained through several years of operating experience.*

**T**OO OFTEN, operators are expected to operate a new plant efficiently without specific training because it is assumed that previous operating experience constitutes adequate training.

This paper describes one company's operator training program. The author believes that the program was unusually extensive and will, therefore, be of interest to management.

Five operating supervisors and twenty-five operators were selected to operate the new unit. These men had operated in one or both of the company's two existing stations. One station is gas-and-oil-fired, low pressure and includes very little automatic control and instrumentation. The larger station of the two is typical of many constructed in the 1930's.

The design of an addition to the larger of these two stations was begun. Compared with the existing station, the new addition included many innovations, such as: boiler-turbine unit design; centralized control room; outdoor boiler; circulating water supplied from either

the river or a cooling tower. The new unit, for all practical purposes, is independent of the units in the existing station.

## Planning the Program

Planning of the operator training program started approximately a year and a half before the date set for commercial operation of the new unit.

Time allotted for preparation of the operating instructions was one year, and the training aids and plant operating personnel were to be selected 6 months before commercial operation started. The schedule provided initial training of instructors and supervisors for about 80 days, and intensive training of operators for another 70 days. Since the plant was expected to start up a month ahead of commercial operation, the operators would get actual practice in this period.

The company authorized the con-

sulting engineers to prepare "Operating Instructions" for the new unit. "You designed this station," the consultants were told, "to perform in a certain way, under certain conditions and to produce certain results. We want our operators to know all these things, so that they can operate the unit as it was designed to operate."

The operating instructions consist of four volumes; Volume I includes the steam generator, Volume II the turbine generator, Volume III the plant auxiliary systems, and Volume IV the unit operating procedures. They were written in twelve months and contain 617 pages of text and 184 illustrations.

All text material was mimeographed and double spaced. All illustrations measured 8½ x 11 in. and consisted of line drawings and photographs or combinations of line drawings and photographs reproduced by the multilith process. Every effort was made to describe the plant in terms of complete, independent systems and associated equipment.

So that the "Operating Instructions" could be used for training the first group of supervisors and operators, and all future operators, word selection was given considerable thought. It was assumed that the average operator's vocabulary would be that of a high school graduate, but would also include terms peculiar to power-plant work. Purely mathematical and engineering terms were avoided. Care was taken to insure agreement between nameplates and the operating instructions.

Each section includes a complete physical and functional description of the equipment, followed by operating procedures for the equipment

\*Contributed by the Power Division and presented at the American Society of Mechanical Engineers Diamond Jubilee Semi-Annual Meeting.

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or system described. The operating procedures define in the correct order the actions to be taken by the operator in placing the unit in service, operating it under load, and removing it from service. Lubrication procedure, where applicable, is included as a part of the operating procedure.

The unit operating procedures in Volume IV describe what must be done to place the boiler-turbine unit in service, to shut it down, to operate it under load, and to cope with certain emergencies. The detailed methods of performing each step are not repeated in this volume, since they are to be found in Volumes I, II, and III.

The Operating Instructions were written specifically for this one unit. Manufacturers' instruction books were used as sources of information for certain sections of the instructions. The manufacturers' instruction books, being primarily installation and maintenance manuals, could not be used in their entirety because they included information and data which were not applicable, and lacked information about the system of which the equipment was a part.

### Training Aids

Training aids were considered essential to effective teaching. Photographic positives of the illustrations in the Operating Instructions were mounted in frames for use with a transparency projector. The illustrations were thus projected onto a 6- x 6-ft screen above and behind the instructor as they were being discussed. In this way, the attention of the student was focused on the diagram on the screen rather than on the one in his book, thus making the instruction more effective.

The advantages of a transparency projector of this type are many. The instructor faces the students at all times and can operate the projector himself. A pencil may be used to point out important facts on the transparency and the pencil's image appears on the screen. Comments in wax pencil can be put on the transparency to correct or clarify the diagram being discussed.

A doodle pad was also provided for the instructor. This was a pad

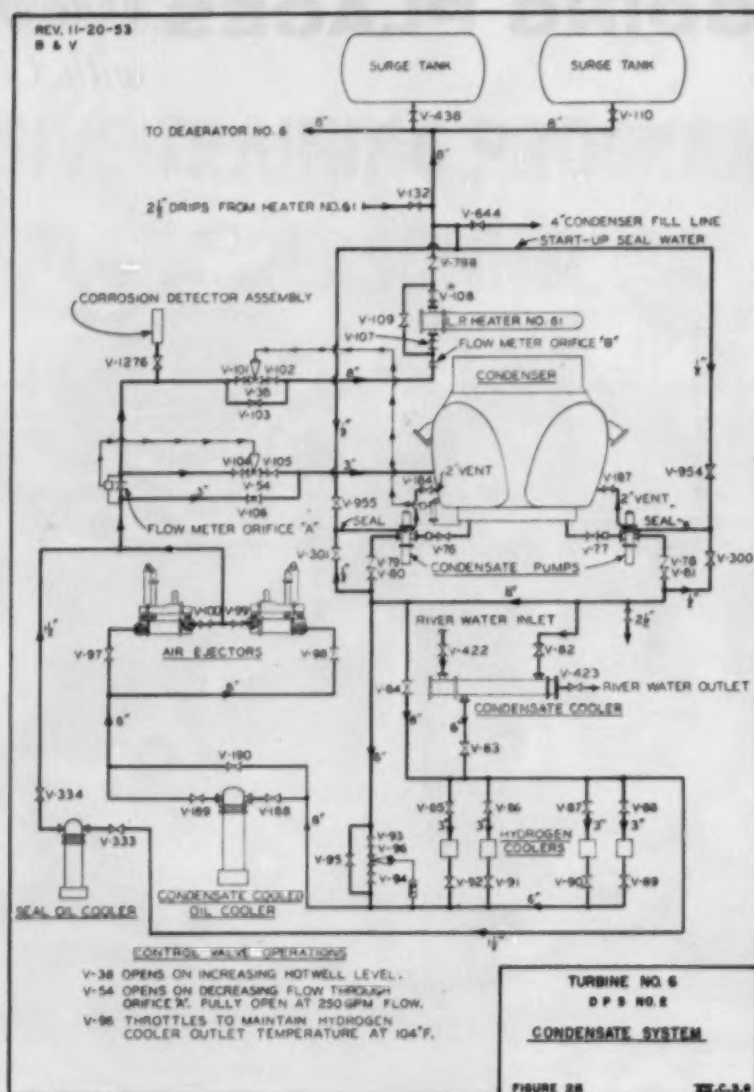


Diagram of Condensate System

of heavy rag paper approximately 3 by 4 ft supported by an easel. Large free-hand sketches were made with either black or colored crayon and could be read easily throughout the room. The sketches were kept for future reference.

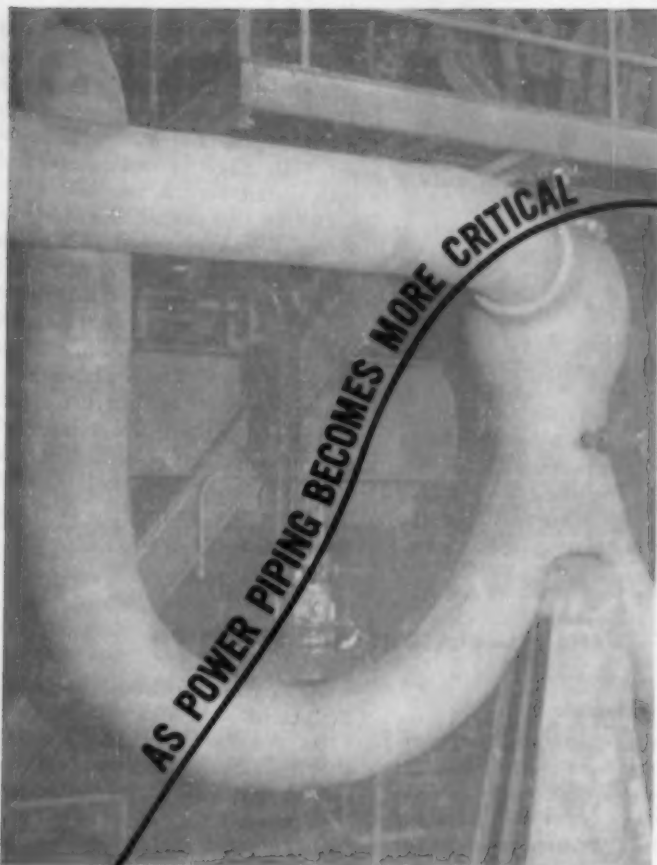
A 1-in. scale model of the control room, prepared during the design of the station, proved too small for teaching purposes. Therefore, large-scale mock-ups of the control panels were made. Pictures of the actual panels taken on the assembly floor at the manufacturer's plant, were enlarged to approximately two-thirds actual panel size, mounted on insulation board and set up in the class room. The mock-ups were

so clear that even the legend plates on the instruments could be read. As a result of using these mock-ups, the operators, upon entering the control room for the first time, were thoroughly familiar with each instrument on the panels.

The panel mock-ups were used for instruction and to simulate actual operation. Plant auxiliaries were put in service, the fans were started, the boiler was purged, mills were started, the generator was synchronized and loaded many times on the panel mock-ups before the fabricated control panels were delivered to the job.

The supervisors were given the opportunity to inspect construc-





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**POWER PIPING—THE VITAL LINK**

## Training Power Plant Personnel (continued)

tion at frequent intervals. They watched the erection of the steam generator and the assembly of the turbine. They examined the auxiliary equipment as each piece was installed, traced out piping and wiring systems, identified equipment and its relation to other equipment, and familiarized themselves with the general arrangement of the plant.

### Scope of Instruction

The training program was divided into three basic sections. The first section was known as *Orientation*, the second as *Phase I—Class Room Instruction*, and the third as *Phase II—On-the-Job Training*.

It had been decided that the operating supervisors should be instructed first, and that they in turn would teach the operators. This was done to impress the operators with the authority and responsibility of the supervisors.

The *Orientation* period permitted the newly appointed operating supervisors to become acquainted with all phases of power-plant operation in the existing station. These men had experience in only one or perhaps two of the several divisions in the existing station. Five weeks were allocated for the supervisors to study turbine operation, boiler operation, switchboard operation and operation of the electrical system. It was felt that after this experience the supervisors would be sufficiently familiar with the component parts of a power plant to comprehend the instruction given in *Phase I*. Further, they would then understand the scope of their new jobs as operating supervisors.

A similar period of orientation was scheduled for the operators. The five weeks of orientation for the operating supervisors, was followed by a one week course in *Instructor Training* by the company's training director. This training familiarized the supervisors with the basic principles of teaching and acquainted them with their responsibilities as supervisors.

#### *Phase I—Class Room Instruction*

for the operating supervisors lasted for six weeks and the *Operating Instructions* were used as text books. The description and operation of each piece of equipment and system were completely covered. Service engineers of the equipment manufacturers assisted the consulting engineers in teaching.

*Phase I—Class Room Instruction* for the operators was conducted by the operating supervisors.

*Phase II—On-the-Job Training* started immediately following the class room instruction of the opera-

tors. Operating supervisors and operators participated jointly in this phase of the training program. They assisted construction personnel in testing and placing in service each piece of equipment and each system for the new unit.

During this period, the study in *Phase I* was reviewed using the actual equipment and systems instead of pictures and diagrams. Service engineers again assisted the consulting engineers in the instruction work. The consulting engineers served as instructor, as well as acting plant superintendent; and, in addition, co-ordinated the work of the construction department, service engineers, and the operating department.

## PHASE I—CLASS ROOM INSTRUCTION

### Teaching Schedule

The four volumes of the *Operating Instructions* served as text books during the six weeks of class room instruction for the operating supervisors. The time required for each subject was estimated and a Teaching Schedule formulated. The service engineers, who were to assist in the training program, had been notified and the dates for their participation were included. Four days each week were spent in study under the direction of the consulting engineers. The head supervisor served as instructor on the fifth day and conducted a review of the week's work.

### Supervisor Instruction

The operating supervisors were high school graduates 37 to 44 years of age. There was reasonable doubt that they could set out on a heavy schooling schedule and keep at it eight hours a day, five days a week. Therefore, the daily schedule called for 50 minutes of instruction and 10 minutes recess each hour. Class was in session from 7:30 am to 11:30 am and from 12 noon to 4 pm five days a week. Frequent hour-long equipment inspection periods were scheduled. It was felt, in this way, that interest could be maintained, that the supervisors would not become restless, and that the change from

work routine to study would be facilitated.

On the first day, the schedule was religiously followed. On the second day, two of the 50-minute sessions stretched out to 90 minutes without recess. Near the end of the third day, one of the supervisors made the sensible observation that the subjects could not possibly be covered in the time allotted if the consulting engineers interrupted their study with a recess every hour.

The attitude the next morning was noticeably changed. The eagerness with which the job was approached was very gratifying. The shyness and reluctance to ask questions, interrupt, disagree, or offer suggestions had disappeared. From that morning on, there were two four-hour sessions each working day. The magnitude of the job had been recognized.

The supervisors were urged to study the next day's assignment at home. Their compliance with this request was evident by the type of questions with which the consulting engineers were confronted each morning.

Instruction followed a definite pattern. The transparencies of the illustrations in the *Operating Instructions* were projected onto the screen. The diagram or illustration was described in detail. The purpose for and operation of each

control valve, thermometer, indicator, flow nozzle, and so on, in the system were discussed. The equipment in the system was similarly described. Recording and indicating instruments and controls associated with the system and located in the control room were identified on the panel board mock-ups.

As an example, the condensate system diagram, shown here was projected onto the screen and explained. Other sections of the "Operating Instructions," covering the panel board instruments and controls that indicate, record and control the operation of the condensate system, were studied at the same time and the instruments and controls were identified on the panel board mock-ups. The devices to operate the annunciators were located in the system and the reasons for their inclusion were given. In this way, there was demonstrated the interrelation of the many component parts which constitute the condensate system.

The combustion-control system is complex. Only two of the supervisors had experience as high-pressure firemen; the subject was new for the majority, operation of combustion control was new to all of them. The combustion control diagram appears in the Operating Instructions. It was evident that it could not be taught as a complete system; so, for instruction purposes, the system was broken down into its components.

The *Proportioning Control* part of the system was drawn separately on the doodle pad. The three types of selector valves, controller, drive units and gas valve were described in detail using diagrams in the manufacturer's instruction book. It was explained that the combustion-control system could be as simple as this one drawn on the doodle pad but that it would be unstable, and that if some metering control were added to proportioning control, a smoother operation would result.

Then the *Metering Control* diagram was added to the basic Proportioning Control, in a different color. The additional control and each of its component parts were described in detail. It was then explained why certain manual adjustment features were desirable



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## Training Power Plant Personnel (continued)

to further refine the operation of the automatic system.

*Manual Adjustments* were added to the *Proportioning and Metering Control* diagram. The relays and their operation were described. For the third time the entire system, which now included *Proportioning and Metering Control and Hand Adjustment*, was reviewed.

Progressively, *Safety Devices and Refinements* were added to the diagram. It was explained how these safety devices were operative only when the fan, coal- and gas-fuel selector valves were in *Auto* and why.

As the system was being developed, the control panel mock-ups were used to identify and locate each instrument and the controls associated with combustion control. To facilitate further study and future teaching, the supervisors used colored pencils to convert their black and white into a colored figure.

The subject of combustion control was not mastered in one session, but, after several brief reviews, was clearly understood.

### PHASE II—ON-THE-JOB TRAINING

Phase II was a continuation of the training begun during Phase I. The theory which had been learned during the class room instruction was put in practice. The teaching schedule for Phase II followed very closely the Teaching Schedule for Phase I, except that the order was revised to fit construction progress.

The construction department completed each system independently, checked it out, and turned it over to the operating department. The system was then studied, traced out, compared with the diagrams in the operating instructions, started up, operated, checked for safeguards and annunciation, and shut down as often as desired.

In this way the component parts of the station, which, when considered separately are relatively simple, were placed in service one at a time without confusion and hurry. By the time the steam

The start-up procedure for putting the machine on the line was broken down into fourteen steps and it was agreed that each of the Steps should be described on a separate copy of the *Duplex Switchboard* drawing. Short, specific instructions, such as "turn synchronizing switch to off," were lettered on each drawing and leaders run from the instructions to the control switch to be operated or to the indicator to be observed. The success of the presentation was readily apparent. Confusion and uncertainty vanished.

### Operator Instruction

*Phase I—Classroom Instruction* for the operating supervisors was concluded, and the same instruction for the operators started the following week. However, more inspection trips to the construction site were made and more time was allowed for each subject. The supervisors shared the instructor's job. Each taught subjects with which he, as a result of his previous operating experience, was most familiar.

generator and turbine generator were placed in service, the auxiliary systems had been mastered thoroughly.

The contractors did not appreciate the importance to the instruction program of completing one system at a time. Therefore, it became necessary to set up a definite *Construction Completion Schedule*. Since the consulting engineers were responsible for the training program, it was logical for them to assume the additional responsibility of setting up the construction schedule which included a detailed list of systems and equipment and the dates on which they should have been completed. This schedule was revised periodically to give the contractors an up-to-date check list with which to work. It definitely expedited the completion of the job and was a great help to the operator training program.

The work of the service engineers, who placed the steam generator and turbine generator in service, had to be co-ordinated with the contractors as well as with the operators. The construction completion schedule was expanded to include their work also.

The operators fired the steam generator during the drying-out period and during the caustic boil. They also tended the drain and vent valves during the acid cleaning. During the steam-line blows and the setting of safety valves, the operators fired the steam generator and controlled the feed-water system. This work consumed approximately 10 days.

During a five-week period the turbine generator was brought up to speed, synchronized and loaded seven times. An oil leak, silica in the boiler water, a delayed cut-in of electrical equipment, a hydrogen leak and a rolled-joint leak all necessitated shut down of the unit. From an operator training standpoint, these shutdowns were extremely beneficial.

Thirteen weeks after the start of Phase II of the training program, the unit was unconditionally released for commercial operation on either coal or gas fuel.

The service engineers were very co-operative and helpful in the additional training given the operators during Phase II. Fortunately, the same engineers who assisted in the training program during Phase I, returned to the job to start up their equipment. A more ideal arrangement could not have been made.

### Conclusions

Two emergencies which occurred during the startup period, were handled with dexterity and showed conclusively that the operators were thoroughly familiar with the equipment and its operation.

A seasoned, experienced crew could not have handled these emergencies with more skill. The complete calmness with which the situation was comprehended, analyzed and remedied pays tribute to the operators and their ability in mastering the subjects covered in the training program.

The unit has operated for over



a year and has never been off the line because of an operating error. No equipment has been misused or damaged through faulty operation. Situations have arisen that could have been hazardous but have been mastered successfully.

It is not uncommon for a new unit to be placed in commercial operation with construction still incomplete. By the time this unit was released for commercial operation on gas, coal or both fuels, all construction had been completed and all control and instrumentation was in service. The *Construction Completion Schedule* developed in conjunction with the training program materially assisted the construction department in finishing all of their work on schedule.

The *Operation* sections of the *Operating Instructions* were revised to a small degree as dictated by the experience gained during startup. They are now complete in every detail, agree with the day-by-day operating procedures, and will serve as texts for all future operator-training for the unit.

## Re-Installation of Bus Supports


(Starts on page 50)

ing Micarta. (Fig. 2.)

The strips are then mounted by angle brackets to the switchgear in a vertical position adjacent to the bus bars. The bus bars and Micarta strips are then bolted together.


At the ends of the bus bars the Micarta to which the barrier type supports is fastened is removed to the outside of the switchgear (Figs. 3 and 4), and remounted. A maintenance crew of five men can change ten barriers in approximately eight hours.

These vertical Micarta strips give the required mechanical strength to support the bus bars and at the same time eliminate the possibility that a path through metallic dust can be established to cause "flash-over" between bus bars. The ease of cleaning is greatly facilitated by this vertical arrangement of supports.



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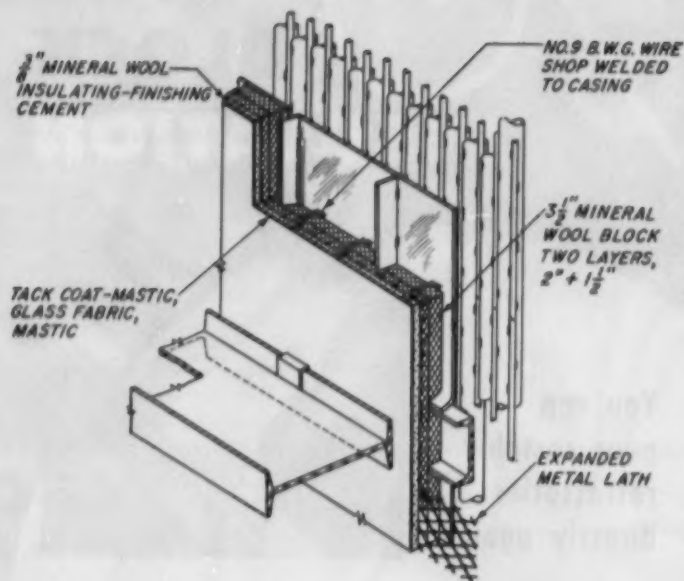


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## HELPING the MAN-IN-THE-PLANT

# Ideas...Methods...Gadgets



### How to Insulate Pressurized Boiler Settings

THE construction of pressurized furnaces, which are becoming increasingly common for the economical production of power, present many design problems not encountered with conventional steam generating plants. For example, the thermal insulation on the boiler waterwalls is placed outside the steel boiler casing, rather than between the casing and tubes, as in a conventional system. The insulation is no longer protected from weather and abuse by the casing nor held securely in place on both sides. Methods for securing and finishing the boiler insulation and the types of insulating materials themselves have been given careful attention in developing efficient, maintenance-free heat barriers over the waterwalls.

As shown in the sketch, Riley-

Stoker Corporation specifies **spun mineral wool block** as the basic insulating material for covering pressurized furnaces. Two layers of blocks are attached to the boiler casing by 9-gage soft annealed iron wire which has been shop welded to the casing prior to its erection. The blocks are secured to the casing, in layers 2 in. and 1½ in. thick, by at least three tie wires per block. Expanded metal lath, secured by the same tie wires, is fastened to the exterior surface of the mineral wool block to provide a base and reinforcement for a ¾ in. thick coat of mineral wool insulating-finishing cement. The white insulating-finishing cement, finish troweled, provides a satisfactory finish for indoor installations, although it may be painted (using a water

base paint if the cement is still wet or an oil base paint if dry) or covered with canvas. Outdoor installations require protection from the weather. Riley-Stoker engineers specify weatherproofing consisting of a tack coat of asphaltic mastic, a layer of glass fabric and final coat of mastic.

The use of **insulating-finishing cement** (for example Baldwin-Hill's Super Powerhouse Cement used by Riley-Stoker), rather than conventional insulating cement, materially contributes to the success of the "inside-out" insulation construction. These modern dual-purpose cements (1) do not shrink upon drying and therefore do not require pointing up of shrinkage cracks, (2) dry in a fraction of the time required by insulating cement (thus eliminating bubbling of asphalt finish applied over wet insulating cement), (3) do not wash off if exposed to rain prior to the application of the weatherproofing.

Initially used only in large power plants but now used in all capacities, pressurized furnace construction provides operating economies by eliminating the cost of induced-draft fans and the space and power the fans consume. Improved combustion with less equipment and the elimination of excess air infiltration also contribute to the increasing popularity of the pressurized furnace.

### The Bulletin Board for Southern Industry

See pages 108 & 109

## Improved Drive Assembly

A YALE-TOWNE pump, which was used as a fluid charging pump on the intake-line to a Kobe triplex-pump, was driven by the prime-mover of the Kobe pump. From a sheave in the drive-shaft between the engine and the Kobe pump, V-belts drove a countershaft that in turn was connected by another set of belts to the Yale-Towne pump.

By removing the countershaft assembly with its two sheaves and an extra set of V-belts, the prime-mover was direct connected to the Yale-Towne pump. In addition to an estimated savings of \$165 for investment costs for the countershaft and extra belts, this idea has eliminated recurrent costs for replacement of belts and for maintenance repairs.

By W. W. BISHOP, Phillips Petroleum Co., Oklahoma City, Okla.



## Peelable Plastic Protective Coating

SMALL shop dipping of cutting tools is simplicity itself in this quart-size tank designed for limited production runs. The plastic-filled tank can sit at one end of the work-bench at all times with thermostat control insuring even heat. Peelable plastic protects the cutting edge and prevents rust.

Courtesy Eastman Chemical Products, Inc.

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with the  
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Remote Reading Gage



**Simple as A-B-C, yet accurate, safe, dependable**

Make your boilers and power plant safer from water level failure. Use an EYE-HYE on each boiler. Engineers can't miss seeing this reliable, accurate device that carries water level reading to panel or convenient wall position.

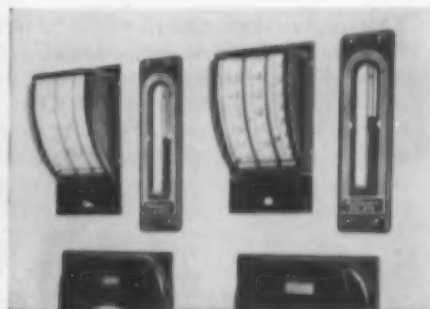
*Simplicity* is the secret of EYE-HYE's dependable full-range accuracy — all hydrostatic operation, no mechanical working parts. Factory-calibrated to your water level range and working steam pressure — cannot be tampered with. Nothing to adjust during installation.

Easy to install, practically no maintenance. Complete "Unitemp" temperature equalizing unit is furnished with each EYE-HYE.

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# Reliance

BOILER SAFETY DEVICES

## Ideas . . Methods . . Gadgets (Continued)

### No One Got Hurt . . . But Was It Safe?

(SP&I Readers Find Several Boners)

**E**LECTRICAL maintenance repair procedures on a line serving a construction job were described in SP&I for June, 1955, page 80. While the equipment and methods employed resulted in a fairly good performance, they included several safety boners. Comments were solicited and sharp-eyed readers report as follows:

#### Not One But Four Boners

"It is never either wise or safe to send only one man on a repair job of this or similar nature. Any chore involving climbing, rigging, structural work near or on any hi-transmission line is, in my opinion, a two-man job. If it was expected that Pete Rhodes' attempt to handle it solo, the Superintendent of Construction was at fault

for not providing a helper-companion. A character Joe seemed available. Two men can work four times as efficiently as can one and it is almost a hundred to one chance that both would be so injured or incapacitated as to make it impossible for one to help the other in the always unpredictable "unknown chance-factor" present on all jobs.

"Pete Rhodes is to be com-



### Virginia Plant Solves Wiring Problem

**R**IGID four-inch conduit had to be terminated inside a junction box for electrical cables entering from the sub-station outside the new office and laboratory building of National Aniline Division, Allied Chemical & Dye Corp., Chesterfield County, Va. Cabinet partitions inside the box were only 10 inches apart, making it impossible to install insulating bushings with a wrench, as is common practice. Bushings are required by the National Electric Code to protect cable insulation from damage caused by sharp edges of conduit.

Insulating bushings, made by The Thomas & Betts Co., were threaded by hand over the conduit ends. Made from a special cellulose acetate butyrate formula, the bushings are easily and firmly installed in this way. The dual-purpose thread design resists loosening from vibration. Bushing sizes cover a range of standard rigid electrical conduit from 1/2 to six inches diameter.

mended for his interest in spotting the bad sheave in the first place and also for his observation of the cracked insulator and his willingness to replace it. But I would say that he was a little too 'eager-beaverish' in his 'time required' estimate. No matter how efficient or competent a mechanic or repairman may be, it is **unwise to time schedule one's self too closely**. Even the best of watches and clocks can fail unexpectedly and again the chance-factor enters.

"The Superintendent stated that 'Pete probably had a flat tire.' The Project Engineer stated positively that 'Pete had a flat tire'—assumption being repeated as an absolute fact. This practice should be most carefully guarded against, not only by workmen but most especially by those in executive or supervisory positions.

"In our little unit which handles voltage from 13.2 KV on down, the workman himself is required to both **open and close personally** any breaker controlling the feeder or circuit on which he is working. Probably this procedure is the primary 'safety boner' referred to."

By ROBERT U. GARRETT, Asheville, North Carolina.

#### More Comments

"Any such operation as the one described should only be executed under **written orders**. Few men, even the biggest, will contest a written order.

"How come no telephone, radio, or smoke signals along that high-line?

"Why did Pete start on the insulator project without sending in a messenger?

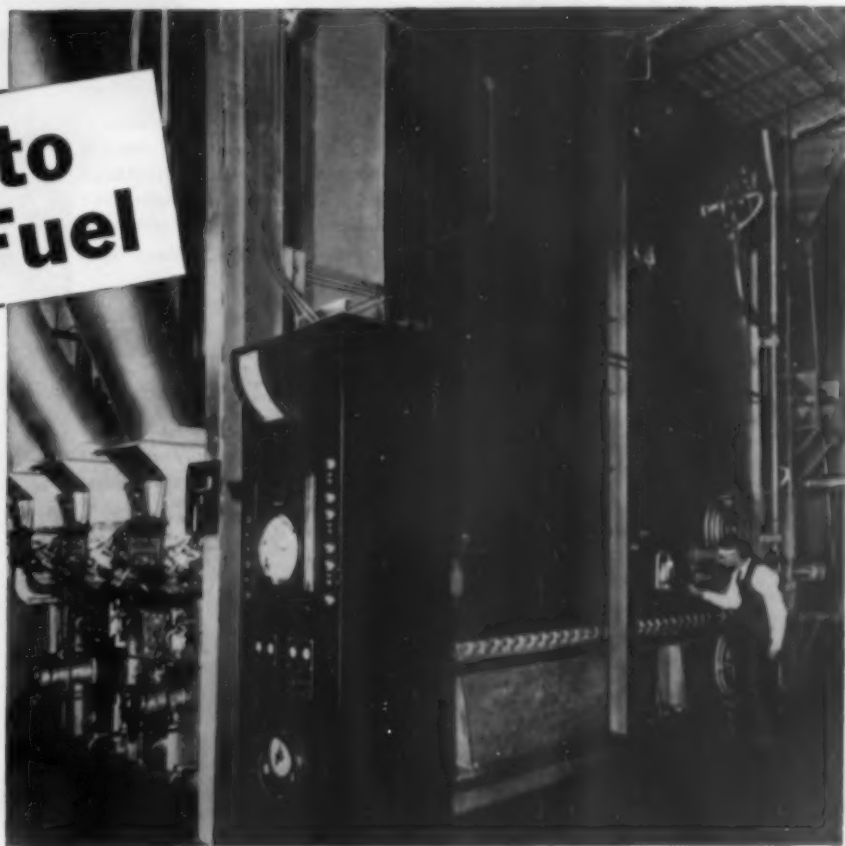
"This is the old safety drama with the same three main characters: the eager beaver, the safety man and the rawhider. The same play is being enacted all over the country. The end result is usually the same. The eager beaver and the rawhider advance to greater things, while the safety man is tagged as a mutineer and an agitator."

By R. W. ENGLISH.



# How to Save Fuel

Fuel savings of 15% have resulted from steam plant modernization at General Mills, Inc., Buffalo, N. Y. The program included this installation of Bailey Meter Control on a 45,000 lb per hr, 170 psi spreader stoker-fired boiler.



● The heat energy you get from a unit of fuel depends on the performance of your steam plant equipment. And that's where Bailey controls can help. With a Bailey-engineered control system you can count on a higher output of available energy per unit of fuel. Here's why:

## 1. Suitable Equipment

When you receive equipment recommendations from a Bailey Engineer his selections come from a complete line of well-engineered and carefully tested products.

## 2. Seasoned Engineering Experience

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PRESSURE  
GAS ANALYSIS  
FLOW LEVEL  
RATIO

## Ideas . . Methods . . Gadgets (Continued)

### Camera Saves Dollars

EVERY large plant engineering group uses a camera to keep up with field work providing pictorial work progress reports and showing final project completion. We use ours for still another purpose. We have a lot of "one-shot" sketches and circuit changes that go through the office daily. Rather than wait for copies, we make a film record of those we want—for just 4 cents each.

In case the drawing is lost in the mail or around the plant, we use

the negative to produce a needle-sharp print. It's cheap insurance as well as a time and money-saver in the busy engineering office.

By L. W. FITZPATRICK, Jefferson City, Missouri.

### Work Bracket Speeds Instrument Repair

A GOOD deal of the instrumentation on several of our units consists of the Minneapolis-Honeywell miniature "Tel-O-Set" recorders. In repairing these in-



struments, they cannot be removed from the control board since they have only a short cable connection.

This, in turn, requires that they be held by one hand while the work is done with the other or that an extra man is required merely to hold the instrument while it is being worked on.

He designed a slanting shelf, which can be hooked on the control board, to lay these instruments on while they are being repaired. The picture shows this work bracket being used. It has proved to be of considerable value in reducing the manhours spent in instrument repair.

By HAROLD WRIGHT, Phillips Petroleum Co., Bartlesville, Okla.



### Cleaning Important in Georgia Mill

THE matter of cleanliness is rated high in importance by Mr. A. C. Link, manager of United States Rubber Company, Stark-Reid Mills, Hogansville, Georgia, where they manufacture hose and belt duck, mechanical yarns, carpet and tufting yarns, asbestos yarns and fabrics, etc.

Because of their inaccessible parts, twisters present a particularly difficult cleaning problem. When the Livingstone "Speedy-electric" steam Jet Cleaner was described to Mr. Link, he requested a demonstration. The results were the cleanest twister in the mill and the purchase of a unit.

The safety factor of the electrode type boiler appealed to Mr. Link, as well as the portability of the unit which is mounted on casters and equipped with 25 ft of steam hose and power supplied by 50 ft of power cord. This enables all equipment in the mill to be reached without much difficulty. Pressure is constant at 125 lb and the power consumption negligible, estimated to be around 18¢ per hour.

### \$\$\$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

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Premium Quality  
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They're simple,  
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dependable.



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Humidity Control



### You Will Insure Better Temperature Control IF—



you use the right type regulator and proper size control valve. Whether a simple self-operating regulator shown at left is required or the air operated controls featured here . . . you can get both types and others from Powers. For further information call or write our nearest office.

**Powers ACCRITEM Temperature Regulator and FLOWRITE Valve**—the right combination for many control problems where pressure and load conditions fluctuate widely, also for control of large size valves.



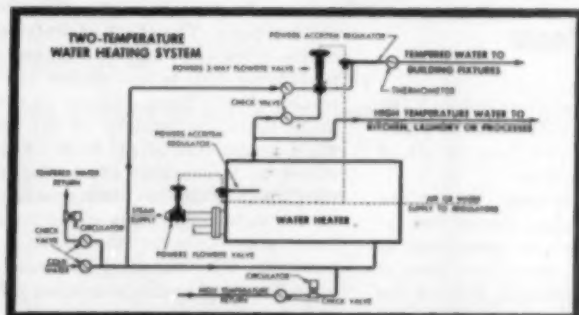
Over  
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Experience  
making this  
type of  
regulator

Control Point  
easily changed

Air or water  
operated

Ranges  
50 to 250°F—150 to 350°F

**VALVES:** Available in a variety of body types and inner valves.

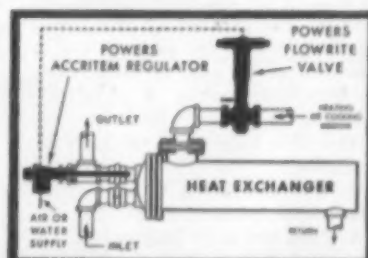
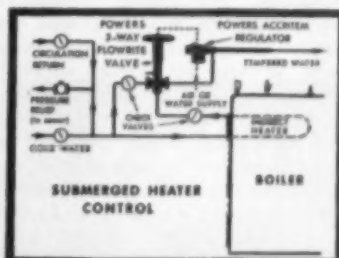
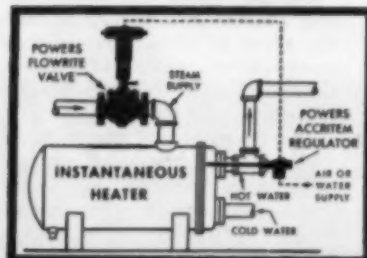


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- Easy to Install • Direct or Reverse Acting, reversible on the job.
- Small Size: Regulator head is 2 3/4" wide, 3 1/4" high, bulb is 1 1/2" long with 1/4" IPS Connection.

Fully Described in Bulletin 316. Write for a copy.



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## Ideas . . Methods . . Gadgets (continued)

### Oil Level Sight Gauge

**A**N inexpensive oil level sight gauge has simplified the checking of cutting oil tanks on high speed routers and drills at Temco Aircraft Corporation, Dallas, Texas.

The sight gauge also has reduced both machine down-time and a recurring threat to safety.

Re-filling cutting oil tanks on 13 radial arm routers and drills and overhead pin routers formerly was a tedious job.

The department oiler's only means of checking was to remove the oil tank filler cap and squint inside the tank with the aid of a flashlight. To do this, he first had to stop the machine and climb up on its oil-slicked table.

Each machine's five-gallon oil tank normally is drained in one full day's operation. To keep up with 13 machines, operating irregularly, the oiler made five to 10 tank-checking circuits a day.



A bargain in cost at \$1.50 apiece, each sight gauge paid for itself in manhours saved just two days after it was installed.

The sight gauge, which works only on machines with a gravity-feed oil system, consists of an up-

right nine-inch plexiglass tube connected to the bottom of the tank by a small elbow joint. Oil stands at the same level in the tube as it does in the tank. Each gauge is mounted at eye level, and all 13 can be scanned from the department aisle.

Now the oiler climbs a machine only when its oil tank needs filling.

By G. W. PATRIDGE, department electrician, Temco Aircraft Corporation, Dallas, Texas.

### Detecting Leaky Valves

**A**METHOD for detecting leaky valves on a Chicago Pneumatic Engine, Model RHGA before the valves are burned beyond repair is to jack or roll the engine over until the magneto impulse trips on the cylinder to be checked.

Then apply starting air to the engine and listen to the intake and exhaust manifolds to detect any escaping air through the intake or exhaust valves. Repeat the procedure for the remaining cylinders.

By B. C. HIMMELBERG, Phillips Petroleum Co., Bartlesville, Okla.

### Selective Silica Carry-Over in Steam

**R**ESearch on the causes of silica carry-over from boilers was furthered by wide-range tests reported at the recent semi-annual meeting of The American Society of Mechanical Engineers.

Although the problem has been investigated widely, the previous data were not complete over the range of modern boiler operation, and often the data of several investigators fail to agree. The purpose of this recent test, according to the authors, was to close some of the gaps by determining the distribution ratios of silica concentrations in steam to those in boiler water over a wide range of operating conditions.

In "Selective Silica Carry-Over In Steam," the authors, E. E. Coulter, E. A. Pirsh and E. J. Wagner, Jr., The Babcock & Wilcox Company, outlined the procedure for the test and reported the results as affected by vaporization and mechanical carry-over. The determinations were made over

a range of pressures from 300 to 3,140 psi, of silica concentrations in water from 12 to 1,000 ppm, and of pH of water from 7.8 to 12.1.

Mechanical carry-over, determined by using a radioactive tracer, was insufficient to necessitate corrections to the vaporous silica carry-over data at pressures above 500 psi. Use of the radioactive tracer was an entirely new technique for testing mechanical carry-over, and was employed primarily because earlier investigators were unable to prove definitely whether mechanical carry-over was present or absent during their tests. The sensitivity of this method was found to surpass by far any other previously used procedure. The authors reported that it was possible to measure to 0.001 per cent moisture in the steam throughout the duration of the test.

The data reported show an almost logarithmic increase of the silica distribution ratio with pressure, and an

increase in this ratio was the water pH decreases. The effect of water pH on the silica ratio becomes greater at the higher pH values where an increase of pH from 11.3 to 12.1 reduces the silica ratio by 50 per cent, while an increase of pH from 7.8 to 9 shows no measurable effect. Between the limits of 10 to 1,000 ppm silica in the water, the silica concentration itself does not affect the distribution ratio, nor does the form in which the silica is added to the test boiler affect the distribution ratio.

Although some mechanical carry-over was found at all test conditions, the effect on silica carry-over measurements was negligible for pressures above 500 psi. It was found that only a negligible part of the silica found in the steam during most test conditions was the result of mechanical carry-over. Therefore, the silica was transported selectively by some other mechanism, probably in vaporous form.

Copies of "Selective Silica Carry-Over In Steam" can be obtained at 50 cents each from Order Dept., ASME, 29 W. 39th St., New York 18, N. Y.





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Tri-K Mining Company  
Terre Haute, Indiana

# Equipment . . Supplies . . Methods

FOR FREE INFORMATION—Circle code number on pages 16 & 17

## Band Welder Offers Several Economies

**H-1** KRAFT EQUIPMENT COMPANY, INC., Southeastern Shipyards, Savannah, Ga., is marketing the Thomas Band Welder—a new tool for installing face wires and their retainer bands on cylindrical filter screens, washers and deckers.

The tool welds the face wire seam and also spot welds the two ends of the band together, creating a joint that has a tensile strength equal to that of the band. Automatic cycle control assures uniform welds consistently. It also eliminates the danger of overheating the band which could be detrimental to the face wire.

Big operating advantage of the tool

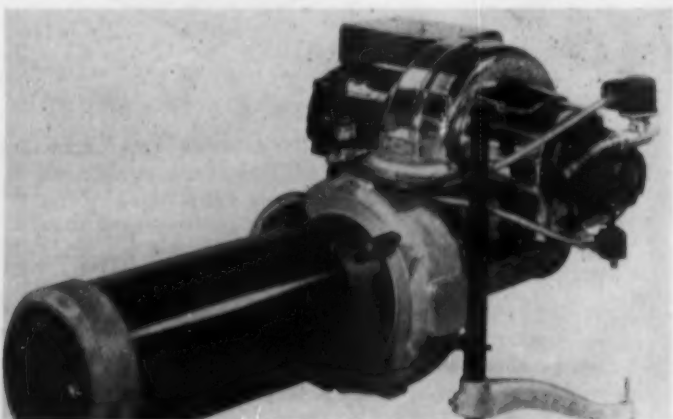


Complete mechanism of the Band Welder is enclosed in a two piece non-conducting Fiberglas case—an important safety feature considering the wet conditions found in and around areas where cylindrical type filters and screens are used.

(over conventional silver brazing techniques) is saving in time. The Band Welder does a job of joining

the face wire and also the six to nine bands required for holding the average face wire in position in less than 60 seconds per band. The normal time required for this operation, using the silver brazing method, will average 2 to 3 hours.

Light weight unit (less than 25 lb) also eliminates the time consuming operation of moving (to the job location) heavy equipment such as an oxy-acetylene outfit or electric welding machine. Old bands can be re-used indefinitely, simply by adding another short piece and welding together. The millwright installing the face wire can, without special training, join the face wire and the retainer bands together with this tool. Unit operates on any 110-volt, 60 cycle outlet.



## Dual Fuel Burner

**H-2** THE WEBSTER ENGINEERING COMPANY, Tulsa, Okla., has announced that the WEBSTER "Cyclonetic" Dual Fuel Burner is available in three sizes over a range of from 15 to 92 hp with low pressure gas and light fuel oil.

It is produced as an assembled, pre-wired and tested package. The burner features a unique stainless steel combustion head to retain the gas flame firmly on the outer periphery of a turbulator to assure smooth,

quiet operation and to prevent overheating and coking of the oil nozzles while burning gas.

The standard units include a complete programming electronic combustion safeguard system with both pre-purge and post-purge by the forced draft blower. Special circuitry is available to satisfy any local code or other approval requirement.

Webster Series B11 Bulletins are available for complete engineering information.

## Pilot-Operated Control Valve

**H-3** A. W. CASH COMPANY, Decatur, Ill., is producing the Cash Standard Type 10, an improved self-contained, single seat, pilot-operated control valve with adjustable throttling range.

It features easy conversion from a pressure reducing and regulating valve to a back pressure control valve by simply switching control piping. Another feature is its dial-type range selector. This adjustment is used to select the throttling range necessary to give the most stable and sensitive control for the particular process application involved.

This valve is of the packless design, resulting in low friction and high sensitivity. A Y-type strainer protects the pilot valve. The diaphragm assembly of the pilot valve can be easily changed for other pressure ranges.

The valve can be used with water, gas, air, light oils and refrigerants, including ammonia and freon. It is recommended for water systems, for altitude control, as an unloading valve on extrusion presses, for back pressure control and for oil refineries and many other applications.



JOSEPH P. SPANG JR.

Portrait by Fabian Bachrach

## “A majority of the employees at Gillette...”

“The United States Savings Bonds program is good for the personal security of the bond buyer—good for the security and economy of the Country. A majority of the employees at Gillette Safety Razor Company purchase Savings Bonds the payroll savings way. Under this plan they find it easy to save a tidy sum for retirement years, to pay that unexpected bill, or meet the expense of other emergencies that arise.”

**JOSEPH P. SPANG JR., President**  
*The Gillette Company*

If less than 50% of your employees are enrolled in the Payroll Savings Plan . . . if you have not conducted a person-to-person canvass in the past two years (*or if you do not have the Plan*), act now! Telephone, wire or write to Savings Bonds Division, U. S. Treasury Department, Washington, D. C. You will hear promptly from your State Director, who will be glad to help you conduct a person-to-person canvass that will put an application blank in the hands of every employee. That is all you have to do. Your employees will do the rest. They want to save for their personal security.

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## SOUTHERN POWER & INDUSTRY



## Equipment . . Supplies . . Methods (Continued)

### Piping Connection

**H-4** GRAY TOOL COMPANY, Box 2291, Houston 1, Texas, is marketing the "Graloc" connection which offers industry a "one specification" connection for all piping applications and pressure ratings.

Connection requires no selection of gaskets, facings or bolts, all parts being fully interchangeable and reusable. The connection employs a two-bolt clamping principle and a stored energy seal.

A steel sealing ring, having flexible lips and a rigid rib fits between the steel connecting hubs. The angle of the tapered lips of the ring is less than the tapered seats of the hubs. As the joint is made up, the lips of the seal ring conform to the seats of the hubs. Internal line pressure serves to increase the effectiveness of the seal without creep or movement.

The rib of the seal ring affords rigidity, necessary both in handling and in preventing excessive crushing or misalignment during use, without



Gray Tool Company's "Graloc" Connection.

sacrificing full bore or minimum pressure area of the connection.

Instead of the usual bolting, "Graloc" uses a two-piece steel clamp which works against tapered shoulders on the connecting hubs. The clamp is held in place by two high-strength steel bolt studs. Bolting can be handled from the top, bottom or

side, and the entire connection can be assembled quickly with no necessity for periodic re-tightening. Internal pressure of the line does not affect the bolting load, and over-tightening will not harm the connection.

The connection will far exceed the pressure limits and bending moments in the heaviest wall pipe. Because it is of all steel construction, expansion or contraction does not affect the seal. It is leakproof when used with any fluid at any temperature the pipe is capable of carrying, including light hydrocarbons, steam and even low molecular weight gases.

In an independent laboratory, a 7 1/16" bore connection was subjected to a dry nitrogen gas test, fluctuating up to 19,500 psi and temperatures up to 172 F without leaking.

Standard "Graloc" connections are made in three styles: butt welding, slip-on and threaded, in a range of sizes from 1 1/2" to 12" for all standard weights from schedule 40 through schedule 160 or XX strong. They can be made for super pressure applications and of heat and corrosion resistant material.

For more data circle item code number on the postage free post card — P. 17

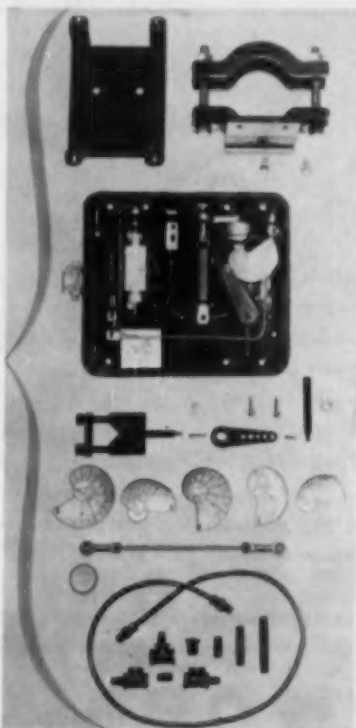
### Positioner Relay Kit Solves Valve Problems

**H-5** BAILEY METER COMPANY, 1050 Ivanhoe Rd., Cleveland 10, Ohio, announces a new

Positioning Relay Kit available for field application to any air-operated control valve. Manufacturer claims this relay will solve such major valve positioning problems as stuffing box friction load, poor response, unbalanced inner valves, hysteresis, and undesirable regulating characteristics.

Where control valves are integral with control systems, this relay is particularly useful in maintaining stable sensitivity and response, amplifying control signals, and providing sequence operation of two or more valves.

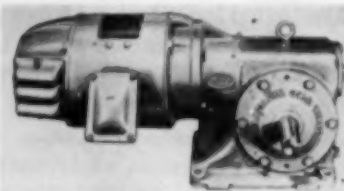
Standard SAMA signal ranges of 3-15 psig or 3-27 psig actuate a force-balance mechanism. As little as 0.065 psig input signal change will apply full output (50 psig max) to valve motor. Relay is direct or reverse acting and suitable for top or bottom-connected valves. Six pre-shaped cams are supplied for square root, linear, square, and half-travel regulating characteristics. Further field shaping is simplified by polar coordinate imprints on cams. A spring clip



locks supply and by-pass air valves in place.

### Motorized Worm Gear Reducer

**H-6** PHILADELPHIA GEAR WORKS, INC., Philadelphia 34, Pa., is producing the new Philadelphia Motorized Worm Gear Reducer, a complete and self-contained, compact right angle Worm Gear Motor, available in a wide range of sizes from 1 hp to 50 hp, having reduction ratios from 3% to 1, to 90 to 1.



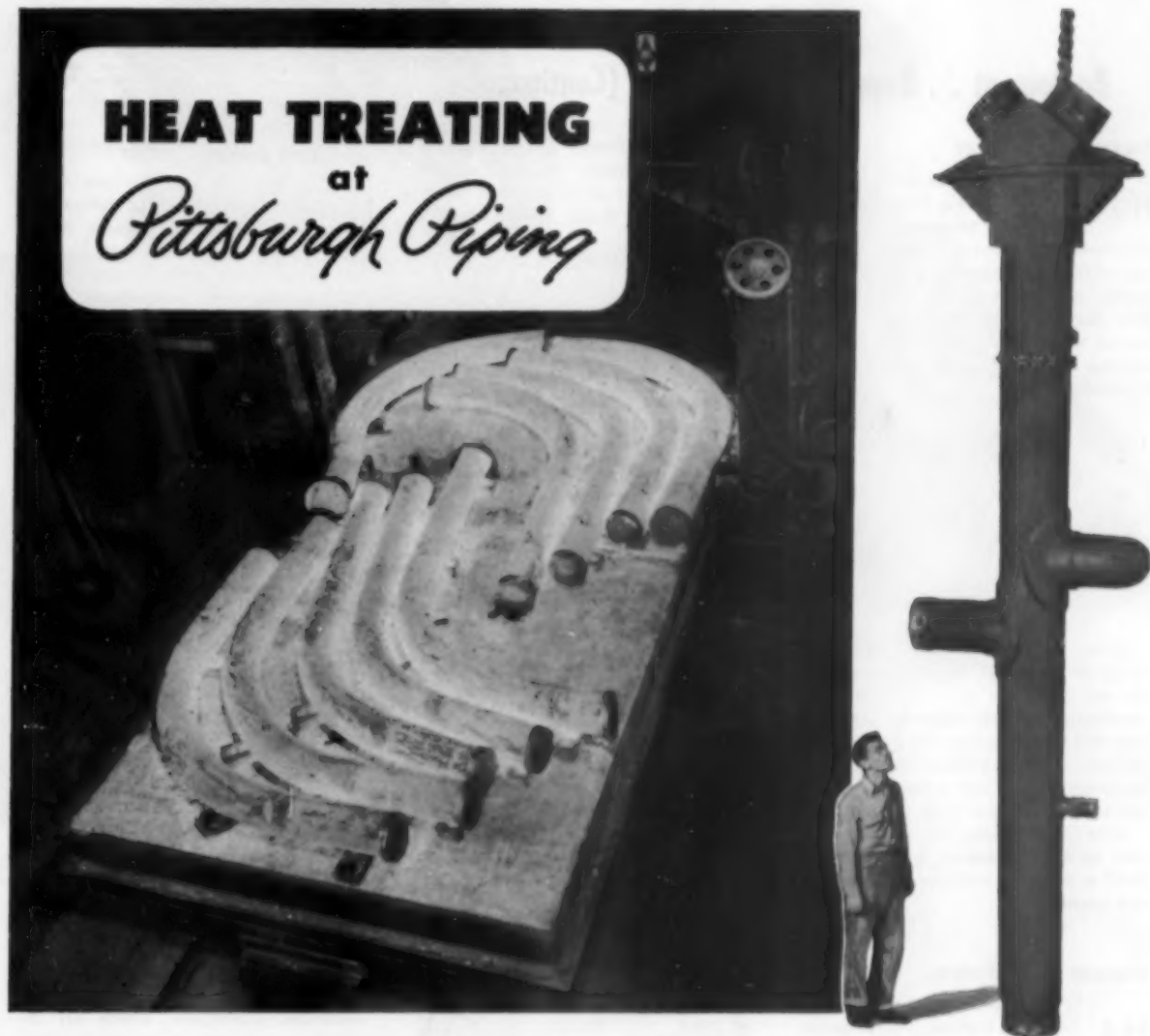
The reducer has been designed to give the most severe industrial service. Gearing and bearings have been oversized for maximum strength. An important feature is that a flexible coupling connecting the motor shaft and worm shaft is enclosed within the gear unit. Thus, the problem of alignment has been eliminated. Due to its extreme compactness, the reducer may be mounted along side your equipment rather than in your aisles.

Philadelphia Gear's Catalog WG-A gives complete ratings and dimensions.



# HEAT TREATING

at  
*Pittsburgh Piping*



## ASSURES PROPER TOUGHNESS, DUCTILITY, AND STRENGTH IN PIPING FOR HIGH TEMPERATURE, HIGH PRESSURE SERVICE

Heat treating and stress relieving at Pittsburgh Piping are operations which produce a uniform grain structure, assure consistent mechanical properties, and remove residual stresses throughout the length of each fabricated piping assembly.

P.P.&E.'s modern gas-fired furnace, illustrated above, is a specially-developed de-

sign. Time-temperature conditions can be electronically controlled in it for proper heat treatment of each type of metal.

This heat treating procedure is assurance that piping fabricated by P.P.&E. will have the most desirable combination of ductility, toughness, impact resistance, and strength.

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Carbon Steel Piping	Forged Piping Materials
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Corrugated Piping	Van Storing
Crossed Bends	Welded Assemblies
Expansion Bends	Welded Stainless Steel Tubing
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*Pittsburgh Piping*  
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Spokane	113 So. Selma Street
Toronto	60 Yonge Street
Washington	Wire Building

## Equipment . . Supplies . . Methods (Continued)

For more data circle item code number on the postage free post card — P. 17

### Pressure Lubricant

H-7

PRESSURE PRODUCTS CO., P.O. Box 342, West Chester, Pa., has announced the development of "Spray-Lube," a new type extreme pressure lubricant which makes it possible to spray a heavy duty lubricant on open gears, open chains, valve stems, etc., without preheating and then applying with brush or paddle.



Spray-Lube can be used in temperatures too high for normal grease or oil, and will not drip or throw off running gears. Its effortless application will encourage proper lubrication of machinery that otherwise would be neglected. Excellent adhering qualities make it a good rust preventive.

Spray-Lube comes in an unbreakable aerosol dispenser, and sells for \$1.25 a can. It is shipped in 6 or 12 can cases.

### Manual Reset Valves

H-8

ELECTRONICS CORPORATION OF AMERICA, Combustion Control Division, 718 Beacon St., Boston 15, Mass., announces Fireye Series 81G Manual Reset Valves which are especially designed



for use with Fireye Flame Failure Safeguard Systems in shutting off the flow of fuels in oil and gas burners in cases of flame failure, fan or pump failure, loss of electrical power, or other faulty operation.

The positive, leakproof closing action of these valves provides maximum protection against burner explosion hazards. Their manual reset mechanism prevents re-opening unless the electric holding coil is energized. Full area port and straight-through body design offers higher capacities with lower pressure drops. Extra-power holding coils, glass insulated for longer life, are provided, together with a corrosion-proofed latching assembly. These new features plus heavy duty construction, assure trouble-free operation with minimum attention on the most rugged industrial service.

### Pneumatic Switches

H-9

THE POWERS REGULATOR COMPANY, Skokie, Ill., is offering a broad line of pneumatic switches.



All types are small, simply designed, and suited for either surface or flush mounting. Connections are 1/4 inch NPT for supply pressures to approximately 25 psi. Positive acting diverting switches are built with 2, 3 or 4 ports. Many functions are possible with various piping arrangements. Several standard engraved dials can be furnished.

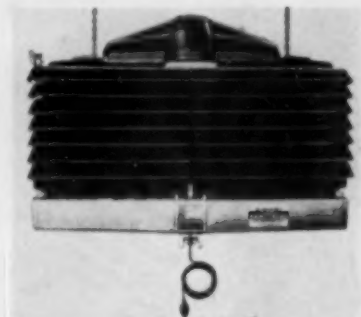
The Gradual Switch (see cut) is a precision built reducing valve. Clockwise movement of the pointer from 0 to 10 on the dial gradually increases delivery pressure 15 psi.

### Infra-Red Space Heater

H-10

PRAT-DANIEL CORPORATION (Thermobloc Division), 2 Meadow St., South Norwalk, Conn., has announced a gas-fired unit heater that is silent, and needs no electrical connections.

Infra-red rays are directed downward and heat the objects or people in its effective range—not the surrounding air. That, of course, means draft-free heat, since no fans or blowers are used.



The "Overhead Panelbloc" heater is available in two sizes, Model CR 63 with a Btu. input of 62,500, and the Model CR 125 with a Btu. input of 125,000. Natural, manufactured, mixed or LP-Air Gas may be used as fuel. The Equipment is AGA approved and may be furnished for either manual or thermostatically controlled operation. There are no moving parts, which means absolute quiet operation, and little or no maintenance is required.

In addition to their use for full plant heating, Panelbloc heaters are ideal for area, or spot heating. It is now possible for workers to be comfortable in a section of a large and otherwise unheated structure, merely by locating Panelbloc heaters in the working area.

## The Bulletin Board for Southern Industry

Southern & Southwestern manufacturers offer free literature on their latest developments in equipment and supplies.

See pages 108 & 109



#### **PROMINENT PUBLIC UTILITY**

## *Cuts ashpit maintenance with B&W Refractory Concretes*

A trial installation of B&W Refractory Castable "A", a 2600 degree refractory concrete, was made in one boiler ashpit. To date this castable has given 25 months more maintenance-free service than the refractories previously used.

Results of this first trial were so encouraging that another ashpit, shown in the drawing above, was lined with B&W Refractory Castable "A". In this installation the two opposing high velocity water sprays cut refractories life two ways. First, water splattered on the hot walls (about 1800F) caused spalling. Second, the high velocity water jets had an abra-

sive effect on the floor refractories.

Here's the report: "After 20½ months service, B&W's Castable "A" lining was still in excellent condition—far superior to the refractories used before."

On the basis of these trials three other boiler ashpits have been lined with this 2600 degree castable.

In addition to ashpit linings, B&W Refractory Castable "A" is widely used in boilers for baffles, hearths, door linings, special shapes, repairing eroded brickwork and forming pier walls in stoker-fired boilers.

B&W Castable "A" is only one of

a line of B&W Refractory Concretes which cost-conscious boiler operators are putting to increasing use in many different applications. These B&W Concretes may help you cut installation costs and lengthen furnace life. Consult your B&W Field Engineer.



**B&W REFRACTORIES PRODUCTS**—B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick  
**B&W Refractory Castables, Plastics and Mortars** • **OTHER B&W PRODUCTS**—Stationary & Marine Boilers and Component Equipment ...  
 Chemical Recovery Units ... Seamless & Welded Tubes ... Pulverizers ... Fuel Burning Equipment ... Pressure Vessels ... Alloy Castings

B&W

# PUMPING GOT A PROBLEM?

PERHAPS THE ANSWER YOU'RE LOOKING FOR  
IS A ROPER ROTARY PUMP

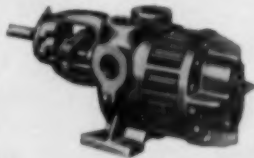
## ROPER PUMP-MOTORS

These units offer low-speed and high-torque, and their versatility finds them well-suited to heavy-duty service within their operating range. In general, recommended speed is 200 to 800 R.P.M. with pressures to 800 P.S.I. In this range, they require from 7 to 40 G.P.M. flow and will develop up to 11.5 H.P. output at maximum speed and pressure.



## ROPER SERIES F PUMPS

Among the dependable Ropers is the Series F Pump — pressures to 300 P.S.I., sizes 1 to 300 G.P.M. It features four-port design with 8 optional piping arrangements... supplied in standard fitted models. With packed box or mechanical seal; with or without relief valve.



## ROPER SERIES K PUMPS

Operate your hydraulic circuit with the correct size Roper for the particular job. In many cases the Series K will do, for it is rated from pressures to 150 P.S.I., capacities  $\frac{1}{4}$  to 50 G.P.M. This model is compact, sturdy... is self-lubricated by liquid pumped. Comes with packed box or mechanical seal... with or without relief valve.



## ROPER SERIES H PUMPS

Lower maintenance costs with a Roper. For instance, a pump like the Series H with pressures to 1000 P.S.I., sizes 10 to 75 G.P.M. is ideally suited for hydraulic mechanisms and for other applications requiring high pressures. Spur gears run in axial hydraulic balance... roller bearings and bronze wear plates reduce friction. Available with packed box or mechanical seal.



## ROPER SERIES 3600 PUMPS

You'll profit more with dependable Roper Series 3600 Pumps on the job... they are speedy, quiet, and plenty rugged. Service-proved features such as self-lubrication, adjustable relief valve, hardened gears, and mechanical seal contribute to Roper dependability. Sizes range from 40 to 300 G.P.M.; pressures to 60 P.S.I.



## new equipment (continued)

For more data circle item code number on the postage free post card — P. 17

## Vent-Drain-Bleeder Valve

GRAY TOOL COMPANY, P. O. H-11 Box 2291, Houston, Texas, is offering the new stainless steel "GRALOC" vent-drain-bleeder valve, selling for \$2.95 and \$3.45 in sizes  $\frac{1}{2}$ " and  $\frac{3}{4}$ " respectively, and designed for 20,000 psi safe working pressure or temperatures up to 1200 F.



Gray Tool Company's low cost stainless steel vent-drain-bleeder valve.

A pressure-aided seat makes it leakproof for oil, water, gas or steam service. It is fabricated from a combination of types 410 and 416 stainless steel, making it suitable for essentially any fluid or atmosphere, and providing a maximum resistance to galling.

It may be used for vents and drains at the high and low points of piping, equipment and instruments, to bleed at double block valves, and as freeze drains, trycocks and sample connections.

## Small Zeolite Water Softener

INDUSTRIAL FILTER AND PUMP MFG. CO., 5900 Ogden Ave., Chicago 50, Illinois, announces several new model zeolite water softeners, in 13 standard sizes with flow rates from 6.5 to 40 gpm to satisfy demands for small volumes of soft water in food and processing plants, commercial and institutional laundries, power plants, railroad locomotives, textile plants and for potable water supply.

These zeolite water softeners are of simple design for convenient operation through a single multiport valve.

GEO. D. ROPER CORP. 438 BLACKHAWK PARK AVE., ROCKFORD, ILL.

SEND NOW FOR DESCRIPTIVE BULLETINS

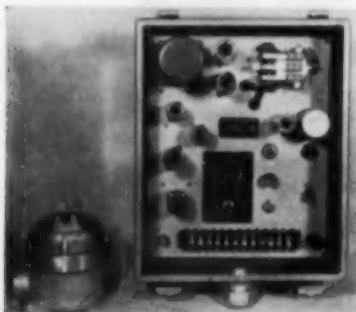
**ROPER**  
Rotary Pumps



They can be supplied with either automatic or semi-automatic controls. In automatic operation, the steps of backwashing, brining, rinsing, and return to service are carried out automatically without operator's attention. With the semi-automatic operation, initiation of the regeneration cycle is controlled by push button.

### Electronic Vibration Monitor Protects Heavy Machinery

**H-13** THE BETA CORPORATION, Box 8625, Richmond 26, Virginia, announces the Model 4 Vibraswitch, available for the protection of large pumping motors, centrifugal compressors, generating units and other heavy equipment from costly damage in the event of excessive vibration.



Such vibration may be caused by bearing failures, bent shafts, etc. Explosion proof pickup may be located at up to 2000 ft from the control unit. Separate time delays are provided to prevent accidental shutdowns on starting or during brief transient disturbances. Test switch provides complete check of amplifier during operation without causing a shutdown. Instrument may be made velocity or displacement responsive with range and calibration to fit application.

### Metal Protective Paints

**H-14** SUBOX, INC., Hackensack, New Jersey, has announced that their established line of Subox and Subalox metal protective paints is now available in pastel and more decorative colors.

The No. 520 series of paints are recommended to utilities, manufacturing and processing plants for color styling their exterior installations as well as for protective maintenance painting.

Utilities are favoring the new

shades for color styling of unit substations and metal clad switchgear in better residential neighborhoods. Deep tones are used for the lower portions (to blend with surrounding terrain or landscaping) and the lighter shades for the upper portions. Such two-tone color combinations tend to reduce the apparent structural size, or the apparent height and make the station seem more distant.

Oil companies are using the new metallic finishes to make large storage tanks blend well with the hori-

zon, yet still maintain heat reflective properties and excellent durability.

Only Subox and Subalox paints contain lead-suboxide as their base pigment. They employ excellent wetting and penetrating linseed-tung oil vehicle to assure maximum rust-inhibition and flexibility, as well as resistance to normal weather, moisture and industrial fumes.

Circle the above code number (on page 16-17) for a color card of the Subalox lead - aluminum glimmer paints.

## Building problems can have 2 RIGHT ANSWERS



Most building problems can be solved efficiently by Armco Steel Buildings. They are of durable all-steel construction; are easily and economically erected; and need little maintenance.



Armco Series S Buildings may be used for tool sheds, offices, shops, warehouses, industrial garages and other structures requiring widths from 4 to 40 feet. Greater widths are available with multiple-span buildings. Unique STEELOX construction simplifies and speeds erection.

Armco Series P Buildings are used for large warehouses, factory buildings and commercial structures needing clear span widths from 30 to 100 feet. These buildings have a steel framework covered by corrugated metal sheets.

Both buildings may be extended or dismantled and re-erected without loss of material.

### ARMCO DRAINAGE & METAL PRODUCTS, INC.

#### DIXIE DIVISION

619 Forsyth Building

Atlanta, Georgia

#### SOUTHWESTERN DIVISION

C & I Life Building

Houston, Texas

Other Offices in Principal Cities



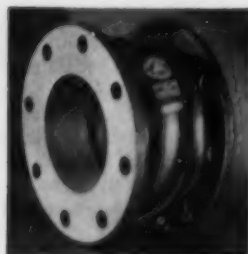
**ARMCO  
STEEL  
BUILDINGS**

Send me data on Armco Steel Buildings:

I'm interested in a building \_\_\_\_\_ feet wide  
by \_\_\_\_\_ feet long.

NAME \_\_\_\_\_

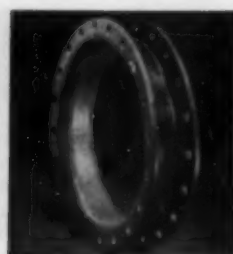
ADDRESS \_\_\_\_\_



Spool-type  
Rubber Expansion Joint



Rectangular-type  
Rubber Expansion Joint

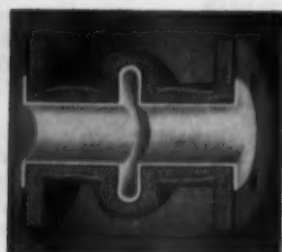


U-type  
Rubber Expansion Joint

## There's a GARLOCK EXPANSION JOINT for your piping applications



All-Teflon®  
Expansion Joint



Rubber Expansion Joint  
with Teflon liner



Expansion Joint for use on  
Haveg and Duriron piping

- To stop vibration, flange breakage
- To relieve stresses and strains in piping and equipment

Garlock manufactures a complete line of expansion joints specifically designed to meet the requirements of different types of service. **Rubber Expansion Joints** are made in all pipe sizes from  $\frac{3}{4}$ " to 72" for water, air, or exhaust steam. They are furnished in round, rectangular, tapered or offset; spool-type and U-type.

All "Teflon" Joints or Rubber Joints with Teflon liner are made for chemical service; Neoprene Joints for oil service. Specially designed Rubber Expansion Joints are now available for use on piping and flanges made by **Haveg Corp.** and **The Duriron Co., Inc.**

Write today for Expansion Joint Folder AD-137.

### THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK

Sales Offices and Warehouses: Baltimore • Birmingham • Boston • Buffalo  
Chicago • Cincinnati • Cleveland • Denver • Detroit • Houston  
Los Angeles • New Orleans • New York City • Palmyra (N.Y.)  
Philadelphia • Pittsburgh • Portland (Oregon) • Salt Lake City • San  
Francisco • St. Louis • Seattle • Spokane • Tulsa.

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

\*The Du Pont Company's Trademark



# GARLOCK

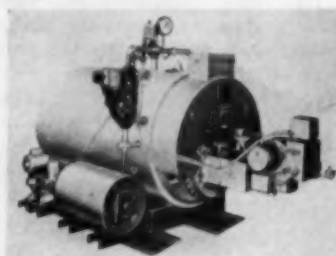
PACKINGS, GASKETS, OIL SEALS,  
MECHANICAL SEALS, RUBBER EXPANSION JOINTS

### new equipment (continued)

For more data circle item code number  
on the postage free post card — P. 17

### Scotch Marine Package Boiler

**WILLIAMS & DAVIS BOILER  
& WELDING CO., INC., 2527  
H-15** Canton St., Dallas, Texas,  
announce a complete one-piece Scotch  
Marine package boiler featuring compact  
design, quick installation, fast  
steaming, portability, and low main-  
tenance.



Only five connections are necessary  
—gas, stack, electric, steam and wa-  
ter. Unit, designed for 100 lb steam  
working pressure, can be used by all  
industries requiring steam for heat-  
ing, power or processing.

General description and detailed  
specifications are outlined in the com-  
pany's bulletin No. 1054. Also avail-  
able on request are 125 and 150 lb  
steam working pressure units.

The "W & D" complete one-piece Scotch  
Marine package boiler.

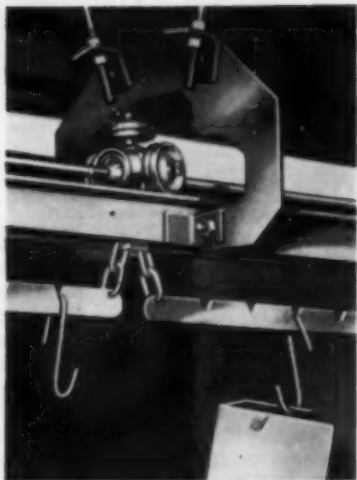
### Chainless Conveyor

**LANDAHL CONVEYOR COM-  
PANY, 534 Dennison Ave.,  
H-16** Columbus, Ohio, has an-  
nounced the Landahl Chainless Con-  
veyor design in which solid steel rods  
replace the usual chain or cable be-  
tween trolley units. These steel rod  
connectors pivot at both ends in ball  
and socket joints anchored within the  
trolley units.

Manufacturer claims this design of-  
fers lower initial cost, more flexibility,  
simplicity of installation, operating  
safety and easy maintenance.

Each trolley unit has four ball-  
bearing "roller skate" wheels on in-  
dividual axles mounted in line, at 90  
deg. intervals around the cylindrical  
trolley housing.

Short-radius turns—either horizon-  
tal or vertical—are made without  
auxiliary traction wheels, sprockets,  
or rollers. The two horizontally  
mounted wheels negotiate all vertical



Universal joints on roller-skate wheels provide easy movement and flexibility of layout.

turns, while the two wheels on the vertical axes automatically come into use on horizontal turns.

Conveyor speed can be regulated from 10 to 25 fpm, and load capacities range up to 100 lb/ft of conveyor line. Conveyor is propelled by a specially equipped standard self-contained cat-pillar drive.

#### Noiseless Solenoid Valve

**H-17** THE POWERS REGULATOR COMPANY, 3400 Oakton St., Skokie, Ill., has introduced a new electro-pneumatic switch with quiet operation as a particular design feature.

Spring, armature, and guide tolerances and material specifications are closely held to prevent alternating current hum. When energized, the new valve passes full air at supply pressures up to 25 psi. When de-energized, the supply port is stopped and the return line pressure is wasted to atmosphere. A built-in manual adjustment permits valve opening when the coil is deenergized.

#### Threadless Fittings

**H-18** TELSCO FITTINGS DIVISION, 5422 Redfield St., Dallas, Texas, is manufacturing malleable iron threadless fittings for joining standard-size steel or plastic pipe—with ten different types and 111 different sizes.

Under the trade name "Telco," the fittings offered are couplings, adapters, 90 deg. elbows, adapter el-

bows, tees (straight and reducing), tees (with threaded branches).

The size range is from 1/2" through 2". Fittings are factory assembled and ready to use on plain end pipe without threading. Pipe end is simply inserted into fitting, and fitting end nuts tightened with an ordinary wrench.

Besides eliminating the time and labor of threading, the fittings produce a stronger connection because the pipe wall is not weakened by threading. Rubber gaskets inside the

fittings protect pipe from the strains of contraction, expansion and vibration.

Fittings hold joint permanently tight, are not effected by the properties of air, water, gas, gasoline, butane or propane, and will withstand temperatures up to 275 F. Fittings are treated with a special rust preventive. Gaskets are Neoprene. Fittings are suited for use in original small-diameter installations or repairs, in industrial piping, chemical plants, gas piping, and machinery.

**IN EASTLAKE, OHIO...**

Powerhouse  
Cleveland Electric  
Illuminating Co.

**Steel Fabricated  
by Ingalls**

**THE INGALLS**

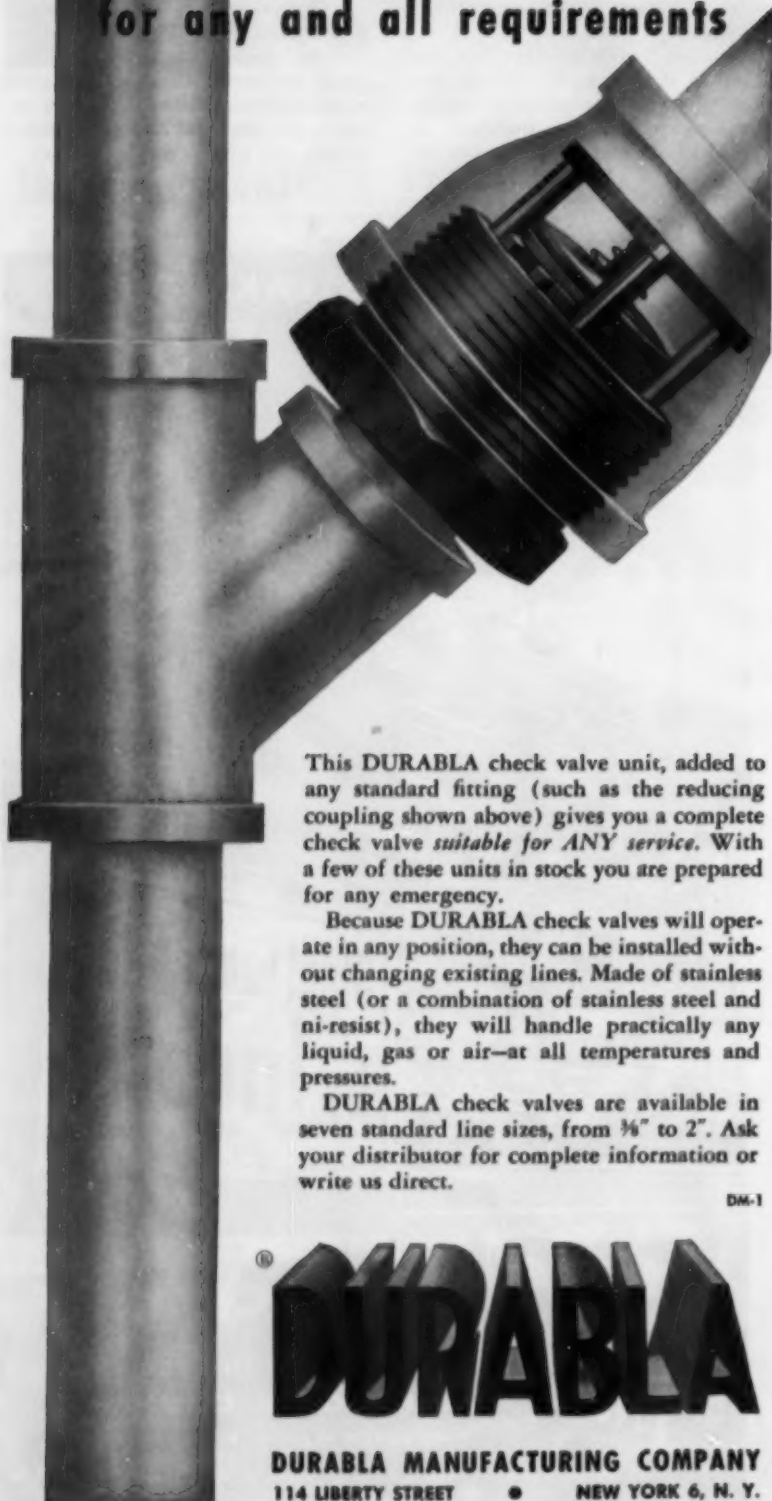
*Fabricating Steel is our Business*

**IRON WORKS COMPANY**

BIRMINGHAM, ALA. • PITTSBURGH, PA.

SALES OFFICES: Birmingham, New York, Chicago, Pittsburgh, Houston, New Orleans, Atlanta

# **NOW** you can stock ONE CHECK VALVE for any and all requirements



This DURABLA check valve unit, added to any standard fitting (such as the reducing coupling shown above) gives you a complete check valve *suitable for ANY service*. With a few of these units in stock you are prepared for any emergency.

Because DURABLA check valves will operate in any position, they can be installed without changing existing lines. Made of stainless steel (or a combination of stainless steel and ni-resist), they will handle practically any liquid, gas or air—at all temperatures and pressures.

DURABLA check valves are available in seven standard line sizes, from  $\frac{1}{4}$ " to 2". Ask your distributor for complete information or write us direct.

DM-1

# **DURABLA**

**DURABLA MANUFACTURING COMPANY**  
114 LIBERTY STREET • NEW YORK 6, N. Y.

## **News (continued)**

(Starts on page 10)

### **Frank Lang, Res. Plant Mgr. of Brooks Equipment—Tenn.**

Appointment of FRANK LANG, JR., as Resident Plant Manager of the BROOKS EQUIPMENT & MANUFACTURING Co., a recently acquired subsidiary of BORG-WARNER CORPORATION at KNOXVILLE, TENN., was announced recently. For the past year Mr. Lang has been Plant Superintendent and Personnel Manager of the Wausau Manufacturing Co., another Borg-Warner subsidiary at Wausau, Wis.

The Brooks company manufactures the Brooks Load Luger, a materials handling unit. President of the subsidiary is J. H. Ingersoll, who also is President of the Ingersoll Kalamazoo, Ingersoll Products and Ingersoll Conditioned Air Divisions of Borg-Warner.

### **Pritchard Representatives —Louisiana & Mississippi**

FACILITY SALES & ENGINEERING, INC., Lee Circle Bldg., NEW ORLEANS, LOUISIANA, has been appointed sales representative for the Southern half of Louisiana and the Southern two-thirds of Mississippi by J. F. PRITCHARD AND COMPANY OF CALIFORNIA, KANSAS CITY, MISSOURI, manufacturer of cooling towers for air conditioning and industrial applications.

The New Orleans company, organized and incorporated in 1935, has many years of experience in the field of cooling tower sales in Louisiana and Mississippi. Personnel includes FRANCIS L. MOTTRAM, DONALD A. LANDRY, and CHARLES B. RICHARD.

### **Vulcan Steel Container Co. Promotes Mitchell—Ala.**

Promotion of RAY I. MITCHELL to the position of sales manager of VULCAN STEEL CONTAINER Co., BIRMINGHAM, ALABAMA, has been announced by GORDON D. ZUCK, company president.

Mr. Mitchell, a graduate of the University of Alabama, joined Vulcan Steel Container Co. in 1953, after service in the Navy and several years in industrial sales work. His headquarters will be at the company's main offices in Birmingham.



### Black Becomes Gen. Supt., Connors Steel—Birmingham

The appointment of J. T. BLACK as general superintendent of CONNORS STEEL DIVISION plant was announced recently by B. C. BLAKE, vice president and general manager of Connors, a division of H. K. PORTER COMPANY, INC., at BIRMINGHAM, ALABAMA.

Mr. Black has been in the operating department of Connors since 1936, except for World War II years when he served in the Navy. He became master mechanic at Connors in 1946.

### Kirk & Cowin—Ala.

RALPH E. KIRK and PERCY G. COWIN announce their association as consulting registered professional engineers in the mineral industries, including coal, non-ferrous ores, iron ores, industrial minerals, and non-metals. Their field covers underground mines, strippings, quarries, coal preparation, and mineral beneficiation. The firm of Kirk and Cowin has offices at Number One 18th St., S.W., BIRMINGHAM, ALABAMA.

### G.E. Electrolytic Capacitor Plant Scheduled for S. C.

THE GENERAL ELECTRIC Co. has announced it will build a new plant at IRMO near COLUMBIA, S. C., to produce aluminum electrolytic capacitors in anticipation that rapid growth of color television will greatly expand the market for that product.

Alfred W. Hough, general manager of the G. E. Capacitor Department at Hudson Falls, N. Y., said the plant, including equipment, will cost about \$6,400,000 and has been specifically designed to satisfy manufacturing requirements peculiar to this type of capacitor.

Occupying a 135-acre site nine miles northwest of Columbia, the plant will consist of a one-story main manufacturing building, an auxiliary manufacturing building and service structures.

Limited production is scheduled to begin early in 1956. The plant will eventually employ about 700 persons.

The site lies between the Saluda River and the Columbia, Newberry and Laurens Railroad, with a hydroelectric generating station of the South Carolina Gas & Electric Co. nearby. The plant is expected to use about 35 million kwh of electric power annually and the manufacturing process will require about 1,000 gallons of cooling water per minute.



Your plant and equipment suffers . . . your community goodwill fades away. These problems can be solved. Prat-Daniel Collectors are designed for the control of industrial dusts and flyash. Multiple small diameter tubes provide powerful centrifugal forces, resulting in sustained high collection efficiency . . . even with ultra-fine dusts.

Whether the problem is industrial dust or flyash, you are assured of satisfaction with P-D Collector Systems, engineered to meet your specific needs.

Write for Reprint No. 102 titled, "What Type Collector?"



Project Engineers  
**THE THERMIX CORPORATION**  
GREENWICH, CONN.

(Offices in 28 Principal Cities)

Canadian Affiliates: T. C. CHOWN, LTD., Montreal 25, Que., Toronto 5, Ont.

Designers and Manufacturers

**PRAT-DANIEL CORPORATION**

SOUTH NORWALK, CONN.

POWER DIVISION: Tubular Dust Collectors, Forced Draft Fans, Air Preheaters, Induced Draft Fans, Fan Stacks

## News for the South and Southwest (continued)

### Dependable Machine Co. Reorganized—Greensboro

THE DEPENDABLE MACHINE COMPANY, INC., GREENSBORO, N. C., was recently purchased by local individuals, a new corporation was formed, and the following officers were elected: CHARLES S. ROUTH, chairman of the board; JOHN C. INMON, president; CHARLES G. MONNETT, JR., vice president and secretary; S. W. INMAN, vice president and treasurer.

Mr. Inmon founded the company in 1938, but for the past two years it has been owned by Robert H. Solem of Wisconsin Knife Works, and A. L. Riche of Freeport, Ill. According to an announcement by Mr. Monnett, the company plans to expand by adding new items to its line, which now consists of moulders, gang rip saws, shapers, hydraulic knife grinders, mechanical knife grinders, cutterhead grinders, sharpeners, knife balancers, and other high quality woodworking machinery.

### Thermoid Warehouse—Atlanta

The opening of a new 3,000 sq ft warehouse at 730 Peachtree Street, ATLANTA, GA., has been announced by the THERMOID COMPANY of Trenton, N. J. In addition to stocking automotive parts, such as brake linings, fan belts and radiator hose, the new warehouse will carry Thermoid's industrial rubber products such as hose, conveyor belts and V-belts. Facilities for matching V-belts, coupling hose and splicing conveyor belts are available at the Atlanta warehouse.

CLARENCE PAINE is warehouse manager.

### Porter & Higgs to Head Norton's Alabama Plant

EDWARD D. PORTER and J. ZACH HIGGS have been appointed manager and superintendent respectively of the new electric furnace plant which NORTON COMPANY is building at

HUNTSVILLE, ALABAMA. Completion of the \$1,285,000 plant is expected by January 1, 1956.

Mr. Porter has been with the Norton Research and Development department at the Chippewa, Ontario, electric furnace plant since 1948.

Mr. Higgs has been superintendent of Norton's bauxite plant at Bauxite, Arkansas, for the past seven years. He joined Norton in 1940 and served as mine foreman six years before being named general ore foreman. He was previously with the Arkansas Bauxite Company.

### Electric Bond & Share Co. Elects Gardner of N. C.

ELECTRIC BOND & SHARE COMPANY has announced that FREDERICK C. GARDNER, president of EBASCO SERVICES INCORPORATED, has been elected a director of Bond and Share, to fill the place of Curtis E. Calder, who died recently.

Mr. Gardner, a native of North Carolina and graduate of North Carolina State College, has been with the Bond and Share organization in various engineering and executive capacities for 38 years. During this period he had extensive business and engineering experience in industrial and utility work. Mr. Gardner was elected president of Ebasco, a wholly owned subsidiary of Bond and Share, in July of 1954 and has been a director of that company since 1945.

### Vepco Elects Cary V. P.

MILES CARY, former operating manager of the VIRGINIA ELECTRIC AND POWER COMPANY, RICHMOND, VIRGINIA, has been elected vice president in charge of operations.

He will have general supervision of all electric and gas operations throughout the company's system.

Cary was born in Richmond and was educated at Virginia Military Institute and the Massachusetts Institute of Technology where he received a bachelor of science degree in mechanical engineering.

He became associated with Vepco in 1926 and after a brief assignment in Norfolk, was transferred to Richmond where he served as efficiency engineer and plant engineer at Twelfth Street power station. He was appointed superintendent of system operations in 1932, a position he held until being named manager of system operation in 1944. Cary was appointed operating manager of the company last September.

*Replacement*  
**Tubes**  
*any size... any boiler*

No matter what your need, B.T.A. carries the most complete stocks of boiler tube sizes and gauges... for any make of boiler. No need for you to stock... you can have spares when you need them... fast! 'Phone or wire!

*Specialty Bending for any need*

**BOILER TUBE CO. OF AMERICA**  
McKEES ROCKS. (PITTSBURGH DISTRICT) Federal 1-7750

for  
BIRMINGHAM \*  
BOSTON \*  
CHICAGO \*  
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MINNEAPOLIS \*  
NEW YORK \*  
PHILADELPHIA \*  
PITTSBURGH \*  
RICHMOND \*  
ST. LOUIS \*  
ST. PAUL \*  
SPRINGFIELD \*  
TAMPA \*  
TULSA \*  
WASHTON \*  
and others

Philadelphia Tampa Los Angeles

### Parker Appoints Industrial Piping—Bessemer, Alabama

INDUSTRIAL PIPING SUPPLY CORP., P. O. Box 184, 705 North 22nd St., BESSEMER, ALABAMA, is announced as a new tube fitting distributor for PARKER APPLIANCE CO., Cleveland, Ohio.

The new distributor, according to R. A. PATTERSON, vice president and manager, will carry extensive stocks of fittings as well as Parker tube fabricating tools to supply needs in Birmingham, Mobile, Decatur, Sheffield, Huntsville and other points in Alabama and also cities in Northwest Florida.

LEW C. ELY is Parker district manager with headquarters in Atlanta.

### Westinghouse Sturtevant Div.—Chattanooga, Tenn.

THE MILLS AND LUPTON SUPPLY COMPANY OF CHATTANOOGA, TENNESSEE, has been appointed a distributor for ventilating sets and industrial fans by WESTINGHOUSE ELECTRIC CORPORATION'S STURTEVANT DIVISION.

Headed by J. B. CRIMMINS as president, the Mills and Lupton Company has been a distributor of electrical, heating and plumbing equipment since 1910. The company will serve an area within a 100 mile radius of Chattanooga.

### Norton Co.—Washington

MACHINERY ASSOCIATES, INC., Wynnewood, Pa., has been appointed exclusive representative in WASHINGTON, D. C., for the Grinding Machine Division of NORTON COMPANY, Worcester, Mass.

They will continue to represent Norton in the Philadelphia area. Under the new arrangement, they will handle both commercial and United States Government business in the Capital.

### New Kerrigan Division

KERRIGAN IRON WORKS, INC., NASHVILLE, TENNESSEE, has announced the opening of a new Bridge Flooring Division, to produce a new four-way grid open steel bridge flooring.

G. G. Greulich of Pittsburgh has been retained as consulting engineer. Harvey F. Neel, a graduate of the University of Alabama and formerly bridge engineer for the Pennsylvania Department of Highways, has been named Chief Engineer for the division, with headquarters at Kerrigan's New York office, 274 Madison Ave.

# BELMONT SHEET PACKINGS



## ASK YOUR DISTRIBUTOR

You know the high cost of packing failure... but do you know the easiest, simplest and most economical way to prevent failures? The answer is to put your problem squarely in the hands of an expert... your BELMONT distributor. Working in close cooperation with Belmont's service engineers and technicians he is in an ideal position to help you select and apply the proper sheet packings for your services... speedily, economically, and all from a single reliable source.

Belmont sheet packings and gasket cutters are sold nationally through this experienced distributor organization. Use them and enjoy a new freedom from packing worry. When it SEALS right—stays TIGHT... you know it's Belmont made.

CLIP and Send Coupon

4R7

## BELMONT PACKINGS

Butler & Sepviva Streets

Philadelphia 37, Pa.

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Without obligation—send us information as checked:

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SEND NAME and ADDRESS of NEAREST BELMONT DISTRIBUTOR



# Catawissa

## PERFECT SEAL Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

**A TYPE FOR EVERY USE!**  
FOR ALL PRESSURES!  
FOR ALL TEMPERATURES!



### Standard & Double Extra Heavy UNIONS

Available with screwed or socket weld ends. 3000-lb. sizes  $\frac{1}{8}$ " to 3"; 6000-lb. sizes  $\frac{1}{8}$ " to 2".



### ORIFICE UNIONS

With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

### MALE & FEMALE UNIONS

With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.



### FULL STAINLESS & FULL ALLOY STEEL UNIONS

With screwed or socket weld ends. 3000-lb. and 8000-lb. service.

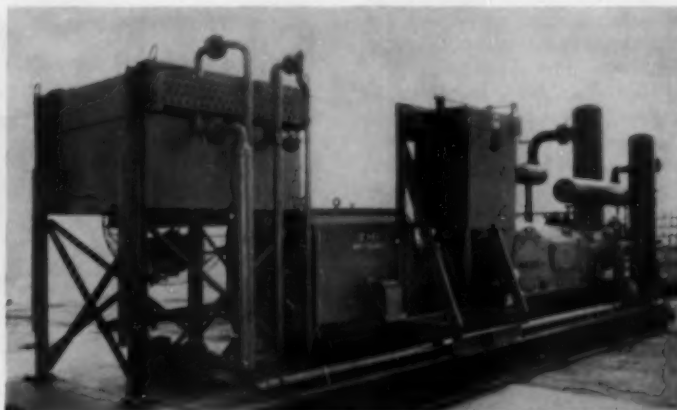


WRITE FOR CATALOG II

Showing the Complete Catawissa line of Perfect Seal Products

**CATAWISSA VALVE & FITTINGS COMPANY**  
950 MILL ST. • CATAWISSA, PA.

## News for the South and Southwest (continued)



### Silicone-Treated Motor Withstands Gulf Storms

FOR the first time, a weather-protected motor is being operated on an off-shore oil-well platform. The 300 hp, 900 rpm "Sil-Clad" induction motor drives a two-stage reciprocating "gas lift" compressor on a platform owned by a California company near the mouth of the Mississippi River in the Gulf of Mexico. Totally enclosed fan-cooled motors are generally used for this type of installation.

Since the equipment is located on a fixed platform instead of a barge and cannot be moved to a sheltered location in case of a severe storm, the motor receives the worst beating that Gulf storms can produce, without being seriously affected. Coil insulation made up of silicone rubbers, tapes and varnishes, is sealed against moisture penetration and highly resistant to corrosion by salt air. Interior and exterior metal surfaces are protected from rust and corrosion by silicone finishes. Blowers, screens and baffles are made of stainless steel. Weather-protected construction protects the motor from the weather, and prevents foreign particles from entering through the intake air stream.

The motor was developed by Electric Machinery Mfg. Company for areas where extra protection is needed against corrosion, moisture and heat. Lower first cost, easier maintenance and more resistance to internal corrosion are a few of the advantages of the silicone-protected motor over TEFC motors, according to the manufacturer.

### G.E.—Waynesboro, Va.

GENERAL ELECTRIC COMPANY'S new multi-million dollar specialty control plant at WAYNESBORO, VIRGINIA, was dedicated on May 14. DR. L. T. RADER is general manager of the Specialty Control Department.

Dedication activities, attended by local and state officials, included open house for all visitors, guided tours of the plant, and an exhibition of typical products.

The Waynesboro plant, which occupies approximately 190,000 sq ft of factory space, is expected eventually to have an annual payroll of about \$2,500,000. (See Industry Speaks in this issue for other comments on General Electric's new Waynesboro, Virginia, plant.)

### Atlantic Steel Breaks Ground for New Mill

ATLANTIC STEEL COMPANY has broken ground for a new \$8½ million merchant bar and rod mill.

According to R. S. Lynch, president of the Atlanta firm, this new mill is the first phase of a modernization and improvement program currently underway, and will substantially increase the company's productive capacity and product range.

General engineer for the construction of the buildings and installation of the new mill is RUST ENGINEERING COMPANY, BIRMINGHAM. The mill equipment will be housed in a building 740 ft long by 100 ft wide. Two warehouses attached to the main building will occupy an additional



52,000 sq ft of space. The mill is expected to be completed and in operation by September, 1956.

Other features of the company's modernization program include a second electric furnace and a new administration building.

### Reynolds Metals Promotes J. C. Black—Richmond

JAMES C. BLACK, general manager of the eastern reduction division of REYNOLDS METALS COMPANY, has been appointed general manager of the company's reduction division, with headquarters in Richmond. He will have charge of the company's six aluminum reduction plants, including JONES MILLS and ARKADDELPHIA, ARKANSAS; LISTERHILL, ALABAMA, and CORPUS CHRISTI, TEXAS.

Mr. Black was graduated from North Carolina State College with a B.S. in Chemical Engineering in the class of 1920. After a number of years in the aluminum industry, he became associated with the Tennessee Valley Authority as a chemical engineer.

He became associated with Reynolds Metals Company in 1940 as superintendent of the aluminum reduction plant at Listerhill, Alabama. In 1943, he was elected assistant vice-president. On January 1, 1946, he was transferred to the Jones Mills plant in Arkansas as plant manager and assistant vice-president of Reynolds Reduction Company, a wholly owned subsidiary of Reynolds Metals Company.

### Southern Chapter ASWA Elects New Officers

The Southern Chapter of the AMERICAN STEEL WAREHOUSE ASSOCIATION held an election of officers at its recent meeting in Savannah, Georgia.

LOWELL H. GREENE, VANCE IRON AND STEEL COMPANY, CHATTANOOGA, is the new president to succeed M. C. SARRAN of ATLANTIC STEEL COMPANY'S Warehouse Division, ATLANTA, GEORGIA, who becomes chapter director and a member of the board of directors for the national organization.

Vice presidents include W. J. Winter, Edgecomb Steel Company, Charlotte; Phil Pidgeon, Pidgeon-Thomas Iron Company, Memphis; and W. E. Moore, Steel Service Company, New Orleans. J. P. Burnett of J. M. Tull Metal and Supply Company, Atlanta, is secretary-treasurer.

The Southern Chapter has sixty-two member companies operating as sales outlets for iron and steel products in nine Southern states.



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• At last—a chain with welds as strong or stronger than the material . . . welds that won't break when links are bent sharply . . . welds made with two projecting lugs that absolutely prevent dangerous kinking of the chain . . . welds that provide  $2\frac{1}{4}$  times the welded area found in normal flash or butt-welded links. Accoloy X-Weld 125 Chains hang straight as a die. Every link is perfectly formed!

Accoloy X-Weld 125 Chain has almost countless uses: Slings, bundling, towing, general utility chains . . . It can be furnished in special analyses and heat treatments to provide greatly extended life and use on tough jobs . . . corrosive jobs . . . abrasive jobs . . . hot jobs. Specify Accoloy X-Weld 125 for your next chain job for a new concept of chain performance, economy and value. Available in  $\frac{1}{4}$ ",  $\frac{3}{8}$ ",  $\frac{1}{2}$ ",  $\frac{5}{8}$ " and  $\frac{3}{4}$ " sizes.

• Ask our nearest district office for further information on ACCOLOY X-WELD 125 CHAIN, or write the American Chain Division, York, Pa., for descriptive bulletin.

The Secret is  
in the Weld!



This Accoloy X-Weld 125 link was ground and etched to show its big welded area— $2\frac{1}{4}$  times the size of welded area possible with other welding processes. This means more than double the security at the weld—and only X-Weld has it!

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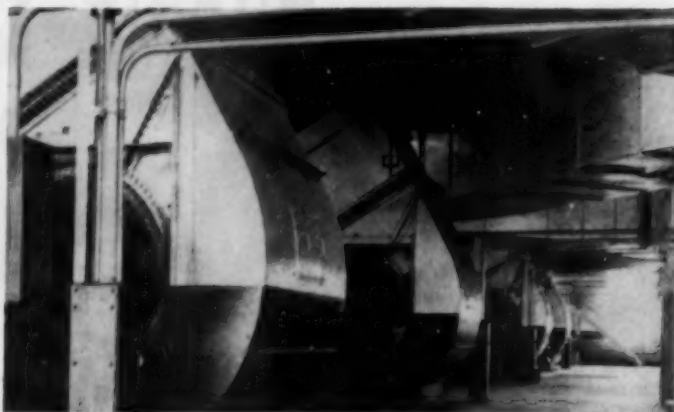
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## News for the South and Southwest (continued)



### Draft Fans at Duke Power's Buck Steam Station

THIS battery of four Westinghouse Sturtevant fans supplies the forced draft for DUKE POWER COMPANY's Buck Steam Station at SPENCER, NORTH CAROLINA. Equipped with airfoil blades, these centrifugal fans provide mechanical efficiency up to 92%. Because of their higher efficiency, they use smaller driving motors, hence less electrical current, than conventional fans would require.

### J. E. Rhoads Offices Moved to Delaware

J. E. RHOADS AND SONS, manufacturers of Tannate industrial leathers, including flat leather belting, leather packings, and textile leathers, have moved their main office from 35 N. 6th Street, Philadelphia, to 2100 W. Eleventh Street, Wilmington 99, Delaware, which is adjacent to their plant.

### G-E Switchgear Units for Baltimore Gas & Electric

THE BALTIMORE GAS AND ELECTRIC COMPANY has placed an order with the GENERAL ELECTRIC COMPANY for metal-clad switchgear which will have an interrupting rating 50% higher than any previously manufactured.

The new units comprising 12 magnet-blast circuit breakers, each rated 750,000 kva, will be manufactured by G.E.'s Medium Voltage Switchgear Department, Philadelphia. Up to the present time, 500,000 kva has been the maximum rating in this type of switchgear.

The order for the new-type switchgear is part of a large expansion program by Baltimore Gas & Electric. The 750,000 kva metal-clad units, which are to be installed next spring, provide growth flexibility needed to meet rapidly growing electric power loads in the Baltimore area.

### McAlpin Heads Atlanta Section of A.S.M.E.

W. J. (BILL) MCALPIN of Atlanta, Georgia, president of the J. J. FINNIGAN COMPANY, INC., one of the South's oldest fabricators of boiler plate, has been elected chairman of the Atlanta Section of the American Society of Mechanical Engineers.

Elected to serve with him are WILLIAM V. BISHOP, vice-president of Evans L. Shuff and Associates, branch vice-chairman, and THOMAS W. WALDROP, district manager of Republic Flow Meter Company, secretary.

### Graver Appoints Atlas-Misrock

H. R. Fosnot, Sales Manager of GRAVER WATER CONDITIONING Co., has announced the appointment of the ATLAS-MISROCK Co. as Graver's new sales representative. The Atlas-Misrock Co., located at 110 North 8th Street, RICHMOND, VA. will handle Graver's complete line of industrial, municipal and industrial waste treatment equipment. Their territory will include the states of Virginia, Maryland and the southern part of Delaware.

Mr. A. Misrock will be the engineering representative handling Graver's equipment. He has many years of extensive experience in the water and liquid treatment fields.

## Automatic Transportation Names Georgia Representative

Appointment of IMC EQUIPMENT, Inc., 1327 Spring St., N. W., Atlanta, as its Georgia franchise representative has been announced by the Automatic Transportation Company.

Supervising sales and service operations for the Atlanta firm is R. L. WARWICK, president of IMC, who has had more than 10 years experience in the materials handling field.

Assisting Warwick are R. B. FOGARTY, J. T. FULWILER, JR., and WILLIAM CHAPMAN. Fogarty heads up service operations for IMC; Fulwiler and Chapman are engaged in sales activities.

IMC will handle the entire Automatic line of rider-type and operator-led industrial trucks. IMC Equipment, Inc., will service industrial and institutional accounts throughout the state of Georgia.

IMC has 4,500 sq ft of warehouse and showroom space for its sales, service and stock parts.

## Texas & Kansas Expansions for W. S. Dickey Clay Mfg. Co.

H. P. Wilhelmsen, President of the W. S. DICKEY CLAY MANUFACTURING COMPANY recently announced a long range program of expansion and modernization.

The first phase of this program, which will be started as soon as plans can be completed, will increase production 40,000 tons per year at the TEXARKANA, TEXAS and PITTSBURG, KANSAS plants and thereby bring the total capacity to 300,000 tons. This step will involve the expenditure of \$1,500,000 for the expansion of these plants.

The new facilities will increase the production of the Texarkana plant by 20,000 tons per year and will involve the installation of additional grinding and tempering equipment, a new horizontal extrusion machine, new drying rooms and one straight line tunnel kiln. The estimated cost of these improvements is \$800,000.00.

At the Pittsburg plant additional drying rooms and a straight line tunnel kiln will be provided to increase production by another 20,000 tons per year. The estimated cost of the facilities is \$700,000.00.

Work on this phase of the program should be started this summer and completed by the end of this year or early in 1956.

The increase of 40,000 tons per year at the Texarkana and Pittsburg

plants will be equivalent to the production of one large clay pipe plant.

The Research and Engineering departments of the company are currently making studies of new techniques of processing to be incorporated in the second important phase of the program involving the construction of a new and modern plant to supplement the production in the territory served by the BIRMINGHAM and CHATTANOOGA plants.

The third and equally important phase of the program involves the replacement of the oldest plant at SASPAMCO, TEXAS with a new and modern plant.

These programs will be undertaken upon completion of the first phase at the Pittsburg and Texarkana plants.

## Harlee Branch, Jr., Pres. Of Edison Electric Institute

HARLEE BRANCH, JR., president of the GEORGIA POWER COMPANY, has been elected president of the EDISON ELECTRIC INSTITUTE. Vice-president of the Institute for the past year, Mr. Branch succeeds Harold Quinton, president of the Southern California

Edison Company, as head of the nation's most important electric utility trade association.

Noted in the electric utility industry for his qualities of dynamic leadership, Mr. Branch is one of the youngest presidents the Institute has had. He recently celebrated his forty-ninth birthday.

Active interest in community progress is characteristic of both Mr. Branch and the company he heads. Georgia Power is well-known throughout the nation for its Better Home Towns program and for other successful area and industrial development activities.

After completing his early education in the Atlanta schools, Mr. Branch went on to Davidson College in North Carolina, receiving his B.A. degree in 1927. In that year, he entered Emory University as a law student, and was graduated in 1931.

He had been a member of the law firm of MacDougald, Troutman, Sams and Branch, of Atlanta, general counsel for the Georgia Power Company, for 18 years when he was elected vice-president and general manager of the company in 1949. Early in 1951 he was elected to the presidency.

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## News for the South and Southwest (continued)

### Corrosion Engineers to Meet in Houston, Texas

Ten symposia and at least 19 meetings of technical committees are scheduled to be held during the 1955 South Central Region meeting of the NATIONAL ASSOCIATION OF CORROSION ENGINEERS. The meeting will be held at the Houston Hilton-Shamrock Hotel, October 18-21.

Titles of the symposia and their chairmen are: Utilities, Charles M. Woodman, Southwestern Bell Telephone Co., Dallas; Chemical Industries, W. G. Ashbaugh, Carbide and Carbon Chemicals Corp., Texas City; Pipeline Corrosion, C. L. Woody, United Gas Corp., Houston; Recirculated Cooling Water Corrosion, C. M. Forbes, Aquatrol, Inc., Houston; High Temperature Corrosion, Milton E. Holmberg, Houston; Cathodic Protection, Gordon L. Doremus, Cathodic Protection Service, Houston; Inhibitors, Norman Hackerman, University of Texas, Austin; Oil and Gas Well Corrosion, W. F. Oxford, Jr., Sun Oil Co., Beaumont; Protective Coatings, L. G. Sharpe, Napko Paint and Varnish Co., Houston; Marine Corrosion, Frank Dial, Pure Oil Co., Houston.

### Yale & Towne—Southeast

The Yale & Towne Manufacturing Company has announced the appointment of ELLWOOD S. MOORHEAD as hoist district sales manager in the Yale Materials Handling Division's southeastern United States district. Moorhead replaces George Sherrill who resigned after 32 years service with the company, the last 25 of which were spent in the southeast.

Formerly Yale hoist district manager in eastern Pennsylvania, Maryland and Delaware, Moorhead will now cover the states of Alabama,

Florida, Mississippi, Georgia and Tennessee from headquarters in Birmingham, Alabama.

His duties in the Middle Atlantic area will be assumed by THEODORE SIMENDINGER, district representative.

### Chemstrand Personnel Changes at Pensacola and Decatur

Roy G. Hemminghaus, vice-president in charge of production for THE CHEMSTRAND CORPORATION, has announced the appointment of DR. CECIL W. GAYLER as production technical manager for The Chemstrand Corporation manufacturing plants at DECATUR, ALABAMA, and at PENSA-COLA, FLORIDA. Dr. Gayler will report to Mr. Hemminghaus.

At the same time, Mr. Hemminghaus announced the appointment of DR. KENNETH JOHNSON to the position of assistant plant manager of the Chemstrand Acrilan acrylic fiber plant at Decatur. Dr. Johnson will report to Mr. F. William Koster, vice-president and plant manager.

## CHIMNEYS CONSTRUCTION AND REPAIR AMERICAN CHIMNEY CORP. 147 4th Ave., New York, N. Y.

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See pages 108 & 109



## Planned Work Areas at Western El.—N. C.

(Starts on page 40)

which can be tapped as required at any location. This loop also feeds compressed air to the penthouses where it is used intermittently to blow foreign matter from the filtering equipment of the heating and ventilating system. Another use of the compressed air is as an alternate supply to the pneumatic heating, ventilating and air-conditioning controls in case of a failure of the small compressor serving them.

Each of the two 800 cfm rotary air compressors is driven by a 150 hp synchronous motor operating off a 4160 volt feeder.

### Air Conditioning

In order to provide cooling water, and controlled temperatures in various process areas, as well as increased efficiency and personnel comfort, a complete air conditioning system has been installed in certain shop areas, office areas, cafeteria and employees' club store.

The air-conditioning system works off a condenser water cycle and a chilled water cycle. The condenser water cycle consists of three sections of cooling tower, pumps and various manual and automatic controls. It operates by passing water through the cooling tower, each section of which has a capacity to cool no less than 1300 gallons of water per minute from 95 F. to 85 F., either by natural draft or by automatic induced-draft fan. Cooled water is then used to cool

### PRINCIPAL PLANT PERSONNEL NORTH CAROLINA WORKS WESTERN ELECTRIC COMPANY, INC.

F. E. Henderson	.....	Works Manager
S. T. Rockwell	.....	Assistant Works Manager
H. W. Norman	.....	Assistant Works Manager
C. W. Reynolds	.....	Assistant Works Manager
T. W. Spicer	.....	Radio Division Comptroller
F. E. Barley	.....	Superintendent, Headquarters Engineering
C. W. Zarman	.....	Radio Division Purchasing Agent
L. C. Tyack	.....	Superintendent, Military Engineering Service
H. W. Sharp	.....	Superintendent, Industrial and Labor Relations
L. L. Welton	.....	Superintendent, Greensboro and Wroughton Shops
S. C. Donnelly	.....	Superintendent, Burlington Shops
H. F. Snyder	.....	Superintendent, Lexington Road Shops
P. B. Lyons	.....	Superintendent, Chatham Road Shops

the air compressors, process equipment and refrigeration condensers and recirculated to the cooling tower.

The chilled water cycle consists of fans, pumps and the evaporators of the refrigeration machines. It operates by pumping water in a closed loop through the evaporator where it is cooled from 55 F to 45 F and circulated through the system. The evaporator cools the water by means of a refrigerant

which is cooled in the condenser, compressed and delivered to the evaporator where it is allowed to expand, thus removing heat from the chilled water loop.

There are two 300 ton and one 400 ton refrigeration machines for air conditioning plus an additional 100 ton of self-contained air-conditioning equipment for process cooling. Of the total capacity of 1000 tons of air-conditioning capacity, 755 tons are used (471 ton in the office building and 284 ton in the manufacturing building). The air-conditioning fans in the manufacturing building are capable of moving 78,000 cu ft of air per minute.

Each of the 300 ton refrigeration machines is driven by a 300 hp, 4 kv synchronous motor. The 400 ton machine is driven by a 400 hp, 4 kv synchronous motor.

### City Water

The plant's requirements of 730 gallons of water per minute are served by a 12 in. cast iron service from a street main at Lexington Road.

## FOR CONTROLLING TEMPERATURE OF LIQUIDS OR GASES

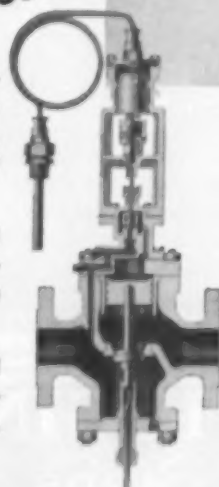
### TEMPERATURE REGULATORS

FOSTER TYPE T

Foster manufactures a complete line of temperature regulators for all types of service — for hot water storage heaters, fuel oil heaters, pasteurizers, ovens, driers, cookers and other process heating and cooling equipment.

They are available in single or double-seated construction; direct or reverse acting; in combination with pressure reducing valves; and in proper materials for the type of service.

Like all Foster valves, they are designed and built for long life with a minimum of maintenance, and are easy to service when necessary. Ask for Bulletin T-101.



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BRONZE, IRON, STEEL,  
STAINLESS STEEL



FIG. 29  
Cylinder with  
Impeller



FIG. 17-28  
Cylinder



FIG. 213  
Flanged



FIG. E-57  
Double  
Window



FIG. 212  
Visibility  
Welding  
Neck or  
Screw



FIG. E-811  
Flapper



FIG. E-1810  
Rotating Wheel Type

All sizes up to 6"

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### WHAT'S NEW and Where to Get It

**S-1 TRANSFORMERS** — Brochure, 8 pages—Describes complete line of distribution and power transformers in sizes from 3 kva to 15,000 kva, and up to 115 kv primary class. Eighteen features of distribution transformer design are outlined and data on coil and core assembly is presented. Detailed mechanical data tables are included. —CENTRAL TRANSFORMER CORPORATION, P. O. Box 487, Pine Bluff, Arkansas.

**S-2 COOLING WITH AIR**—Brochure, 13 pages—Explains "Solo-air" and "Combin-air" methods of eliminating or minimizing water problems by dissipating heat direct to air. Typical problems and solutions are given. Photographs illustrate applications in a wide variety of services directly using ambient air for cooling, and the "one package" integrated cooling system using combination of maximum air and minimum water. —HUDSON ENGINEERING CORPORATION, Fairview Station, Houston, Texas.

**S-3 WATER CLARIFICATION** — Catalog 290, 29 pages—A thorough, technical discussion of a new approach to the solution of stream pollution problems. Causes of water pollution (sizes finer than  $\pm 150$  to  $\pm 200$  mesh) can be isolated by a combination of mechanical screening and hydraulic classification. Water clarification process described is based on gravity. Technical data deals primarily with integration of coal preparation and water clarification processes. However, materials other than coal will also respond to the same or similar treatment. —HAWORTH ENGINEERING & MANUFACTURING COMPANY, 930 Second Ave., No., Birmingham 4, Ala.

**S-4 STEEL BUILDINGS** — Catalog No. 3, 26 pages—Photographs show Star steel buildings in use by specific plants in various industries including warehouses, gins and mill buildings, factories, and many others. Construction details are explained; and building components, estimating data sheet, sample floor plan, and engineering service are covered. —STAR MANUFACTURING COMPANY, 3812 South Stiles, Oklahoma City, Okla.

**S-5 PIPE COVERING**—Bulletin, 6 pages —"Walex" corrosion resistant permanent aluminum pipe covering is described. Photographs show four steps necessary for simple application. Gives specifications and tells how insulation is protected and labor

costs are cut. —WALEX METAL PRODUCTS COMPANY, 1202 West 14th St., Houston 8, Texas.

**S-6 CHEMICAL CLEANING** — Bulletin, 4 pages—Offers a solution to the problem of deposits in piping systems by the company's chemical line cleaning service. Line drawings show use of chemical method, pipe line pig, and jet moles. Photographs and case histories are included. —DOWELL INCORPORATED, P. O. Box 526, Tulsa 1, Okla.

**S-7 CASTINGS**—Catalog, 28 pages—Partial list of company's foundry products and equipment, together with engineering data and tables for ready reference. Describes large capacity foundry facilities, with high precision and extra large capacity machine tools for heavy industrial and marine work as well as sugar machinery. Photographs illustrate equipment, and plant applications. —SERVICE FOUNDRY, 416 Erato St., New Orleans 12, La.

**S-8 PLASTIC SHAPES** — Loose-leaf Catalog, 34 pages — Engineering data, ordering specifications, and price lists for sheets, rods, tubes, tapes, packing sets, bellows, spiral back-up rings, o-rings, envelope gaskets, filled teflon, vee, and special shapes available in DuPont's Teflon, Kellogg's Kel-F, and Hi-Quality Nylon, are given, with photographs and line drawings for illustration. —JOHN L. DORE CO., P. O. Box 7773, Houston 7, Texas.

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**S-9 ELECTRICAL EQUIPMENT**—Pictorial Index, 16 pages—Shows a number of the principal items of electrical equipment, including explosion-proof air circuit breakers and magnetic motor starters; explosion-proof lighting panels, control stations, junction boxes and special equipment; water-tight and dust-tight cast iron junction boxes; high voltage motor starters with current-limiting fuses, etc.—NELSON ELECTRIC MANUFACTURING CO., 217 N. Detroit St., Tulsa, Okla.

**S-10 PIPE CONNECTION**—Catalog 55, 12 pages—General description of new "Graloc" pipe connection featuring "one specification" for all piping applications and pressure ratings; includes construction, operation, advantages, specifications, dimensions, and price list. Illustrated with photographs and line drawings.—GRAY TOOL COMPANY, P. O. Box 2291, Houston, Texas.

**S-11 ASA CLASS VALVES**—Catalog 55-B, 20 pages—Lists ASA Class full round opening valves and venturi opening valves, for fluids and gases. Gives general material specifications, descriptive information, freight allowances, applications, and includes plastic packing and alloy steel cap screws. Equipment is illustrated. Maximum temperature rating of plastic packing is 250 F.—ORBIT VALVE COMPANY, P. O. Box 699, Tulsa, Okla.

**S-12 WATER TUBE BOILERS**—Booklet—Describes details of stoker—oil or gas or combination gas/oil, 10 to 250 hp to 250 psi; designed for easy conversion to any fuel.—QUEEN CITY ENGINEERING COMPANY, INC., P. O. Box 3103, Charlotte, N. C.

**S-13 GAS BURNER**—Bulletin—Describes the Rectilinear gas burner, an application of the venturi principle which provides high input through narrow rectangular openings for firing—in a horizontal plane through fire doors or small openings over handfired coal grates or stokers—or for firing in a vertical plane on either side of stoker or oil burner.—THE WEBSTER ENGINEERING COMPANY, 419 West 2nd St., Tulsa, Okla.

**S-14 TANKS OF STEEL AND ALLOYS**—Catalog 192-P&BS—All types of tanks for hot water storage, bulk liquid storage, oil or chemical storage, and other unfired pressure vessel use are illustrated and described.—J. J. FINNIGAN CO., INC., 455 Means St. NW, Atlanta, Ga.

**S-15 ALUMINUM PIPE JACKETING**—Folder J-25—Gives complete applications and instructions for the use of Childers jacketing for weather-proofing of insulated lines, towers, vessels and tanks. Illustrated with detail drawings.—CHILDERS MFG. CO., 625 Yale St., Houston 7, Texas.

**S-16 MAINTENANCE IDEAS**—"Genius at Work"—Contains ideas about plant maintenance, bits of philosophy, new products and a description of the company's line.—KANO LABORATORIES, 1047 S. Thompson Lane, Nashville 11, Tenn.

**S-17 METAL STAMPING FACILITIES**—Brochure No. 100—Describes shearing, blanking, drawing, forming, embossing, assembly and finishing equipment in Camper's Carolina plant which offers Southern industry convenient, modern facilities for metal stamping. Covers 67 major units of equipment, including 200 ton hydraulic press, to produce finished metal products, from design through delivery.—CAROLINA METAL PRODUCTS, INC., P. O. Box 3636, Charlotte, N. C.

**S-18 OIL AND GASOLINE CONTAINERS**—Catalog No. 55—Illustrates and describes entire line of oilers, safety cans, and oil and gasoline containers available for industrial plants and other users.—EAGLE MANUFACTURING CO., Dept. 55, 2553 Charles St., Wellsburg, W. Va.

**S-19 V-DRIVE SELECTIONS**—Engineering Guide No. 56-B—Tells how to make V-drive selections quickly and accurately, using new horsepower rating and improved rating techniques. Simplified formulas for standard quarter-turn and V-Bal drives are augmented by tables of drives in all belt sections.—FORT WORTH STEEL & MACHINERY COMPANY, P. O. Box 1938, Fort Worth, Texas.

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**S-20 STAINLESS STEEL FLOOR GRATING**—Catalog, 4 pages—Covers "Weldforged" stainless steel floor grating for the chemical, oil, and packing industries, and for other applications requiring a rust-proof, chemical-proof, grating with high heat resistance. Standard table of safe loads is included.—KERRIGAN IRON WORKS, INC., 1933 Herman St., Nashville, Tenn.

**S-21 METALS, VALVES, FITTINGS**—Catalog No. 55, 215 pages—Lists items carried in Atlanta stock, as well as material that can be furnished from Tull's regular sources of supply: Aluminum, brass and copper, monel and nickel, stainless steel, steel and steel tubing; and a complete line of fasteners such as bolts, screws,

rivets, etc. Also included is a section on industrial supplies: Roofing, solder, babbitt, tool steel, valves and welding fittings. A brief technical section gives data on metals and their applications.—J. M. TULL METAL & SUPPLY CO., INC., 285 Marietta St., N. W. (P. O. Box 4628), Atlanta, Ga.

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## Water Resources of the South (continued)

(Starts on page 39)

laws have, however, been superimposed on the laws with respect to riparian rights.

### Supply and Demand

Today, we find the South and Southwest expanding on all fronts. New manufacturing and power plants and increased agricultural activity have greatly increased the water demand. The Southern states enjoy, comparatively speaking, an abundant rainfall. The average for the United States is about 29 in. per year. The Southern region has rainfall ranging, in its mountain areas from 65 to 70 in., and in its coastal or plains region from 30 to 35 in. The average rainfall for the Southern region is about 40 to 45 in. per year. However, last year the entire South suffered a drought which was the severest in 25 years. For the first time, there was not enough water to go around.

Some Southern states had begun to consider changing their water laws long before the drought came. In other states, it caused the people to say that something had to be done. Texas has had water laws giving the state control of all of its water for some time. There, a Board of Water

Engineers issues permits for the use of water. Arkansas is considering a plan whereby the state will control all "surplus water." South Carolina has had a Water Policy Committee studying its water laws and preparing recommendations for new laws since 1953. In Georgia, the last legislature created a committee to study the water laws, examine resources, and recommend any needed revision in the water laws of the state.

The need for regulation of water sources depends on several factors:

1. Is the supply of good water adequate to meet the needs of all users: individual, industry, agriculture, municipalities, and recreation?
2. Do the present laws promote or encourage the desirable growth and expansion in municipalities, industry, and agriculture?
3. Are the people ready and willing to accept the state's assumption of control over all water in the state?

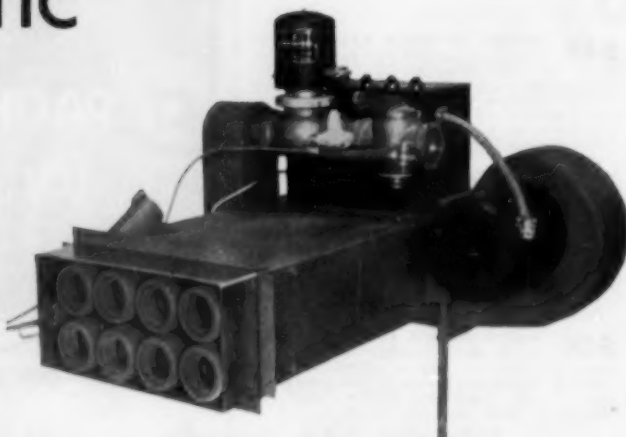
The need for regulation of water resources in any state will depend upon a very careful and searching inquiry of these questions. The real answer might be found in a sound conservation program rather than in more state regulatory laws.

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<b>B</b> Babbitt Steam Specialty Co. .... 113 Babcock & Wilcox (Boilers) .... Babcock & Wilcox Refractory Div. .... 93 Bailey Meter Co. .... 83 Belco Industrial Equipment Div. .... Bell and Zoller Coal Co. .... 87 Belmont Packing & Rubber Co. .... 101 BIRD-Archer Co. .... Bituminous Coal Institute .... 33 Blackmer Pump Co. .... 113 Blaw-Knox Co.—Grating .... Blaw-Knox Co., Power Piping Div. .... Boiler Tube Co. of America .... 100 Borden Metal Products Co. .... 28 Buell Engineering Co., Inc. .... 34 Bunting Brass & Bronze Co. .... Bussman Mfg. Co. .... 20 & 21 Byers Co., A. M. .... 67 Byron Jackson Co. ....	<b>G</b> Garlock Packing Co. .... 96 General Coal Co. .... 114 General Electric Co. .... 30 & 31 Goulds Pumps, Inc. .... Graver Water Conditioning Co. .... Grinnell Co., Inc. .... Gulf Oil Corp. .... 25	<b>P</b> Pacific Pumps, Inc. .... 57 Parkdale Co. .... Peerless Pump Division Food Machinery & Chemical Corp. .... 65 Petro .... 27 Philadelphia Gear Works .... 23 Pittsburgh Piping & Equipment Co., Inc. .... 91 Porter, Inc., H. K. .... Powell Valves .... Powers Regulator Co. .... 85 Pratt-Daniel Corp. .... 99
<b>C</b> Carey Mfg. Co., Philip .... 13 Carolina Metal Products Co. .... Catawissa Valve & Fitting Co. .... 102 Chapman Valve Mfg. Co. .... 36 Chesapeake & Ohio Railway Co. .... 35 Chicago Bridge & Iron Co. .... Childers Mfg. Co. .... Cities Service Co. .... 73 Clarage Fan Co. .... 111 Classified Ads .... Clever-Brooks Co. .... Cochrane Corporation .... Fourth Cover Cole Mfg. Co., R. D. .... Combustion Control Division Electronics Corp. of America .... 8 & 9 Combustion Engrg., Inc. .... 69 Combustion Equipment Division Todd Shipyards Corp. .... Continental Gin Co. .... Third Cover Cooper-Bessemer Corp. .... Copes-Vulcan Division — Continental Foundry & Machine Co. .... Crane Company .... Cyclotherm Corp. ....	<b>H</b> Hotel Pittsburgher ....	<b>Q</b> Queen City Engineering Co. .... 29
<b>D</b> Dart Union Co. .... Detroit Stoker Co. .... Diamond Chain Co., Inc. .... Dixie Engineering Co. .... 111 Dowell, Inc. .... Durabla Mfg. Co. .... 98 Durametallic Corp. .... Durkee-Atwood Co. ....	<b>I</b> Ingalls Iron Works Co. .... 97 Ingersoll-Rand Co. .... Iron Fireman Mfg. Co. .... 58 & 59	<b>R</b> Reliance Gauge Column Co. .... 81 Republic Flow Meters Co. .... Riley Stoker Corp. .... 62 & 63 Roper Corporation, Geo. D. .... 94
<b>E</b> Electric Service Co. .... 111 Elgin Softener Corp. .... Erie City Iron Works .... Ernst Water Column & Gate Co. .... 108 & 111 Eutectic Welding Alloys Corp. .... Everlasting Valve Co. ....	<b>J</b> Jenkins Bros. .... Jerguson Gate & Valve Co. .... Johns-Manville, Inc. ....	<b>S</b> Sinclair Refining Co. .... 7 Southern Natural Gas Co. .... 24 Southern Power & Industry .... Southern Railway System .... Southern Valve Corp. .... 111 Sprague Electric Co. .... Standard Oil Co. of Ky. .... 28 Stephens-Adams Mfg. Co. .... Sterling Electric Motors, Inc. .... Stone & Webster Engineering Corp. .... Stromberg-Carlson Co., Telephone Division .... Sturtevant Div. Westinghouse Electric Co. .... Subox, Inc. .... Superior Combustion Industries, Inc. ....
	<b>K</b> Kano Laboratories .... Kellogg Company, M. W. .... 75 Kerrigan Iron Works, Inc. ....	<b>T</b> Taylor Forge & Pipe Works .... Terry Steam Turbine Co., The .... 22 Texas Co. .... Todd Shipyards Corp. Combustion Equipment Division ....
	<b>L</b> Leslie Co. .... 113 Lubriplate Division, Fiske Bros. Refining Co. .... 106	<b>U</b> United States Steel Co. .... U. S. Treasury .... 89
	<b>M</b> Madden Corp. .... 108 McBurney Stoker & Equipment Company .... 104 Magnetrol, Inc. .... 114 Manning, Maxwell & Moore, Inc. .... Mansel, Inc. .... 77 Mason-Nellian Regulator Co. .... 14 & 15	<b>V</b> Virginia Gear & Machine Co. .... 23 Voss Company, J. H. H. .... 105
	<b>N</b> National Atroll Burner Co. .... National Aluminate Corp. .... National Coal Association .... 23 National Supply Co., Spang-Chalfant Div. .... National Tube Co. .... National Valve & Mfg. Co. .... 71 Niagara Blower Co. ....	<b>W</b> Walworth Co. .... 26 Want Ads .... 111 Warren Steam Pump Co., Inc. .... Webster Engineering Co. .... 110 Westinghouse Electric Co. — Sturtevant Division .... Wiegand Co., Edwin L. .... Wiggins Co., John B. .... 108 Wilson, Inc., Thomas C. .... Wing Mfg. Co., L. J. ....
		<b>Y</b> Yarnall-Waring Co. .... 55

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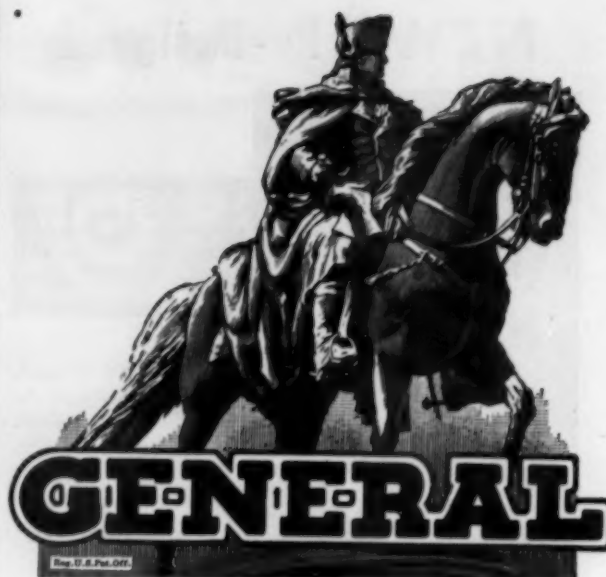
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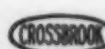
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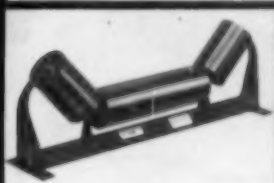
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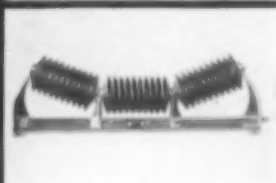
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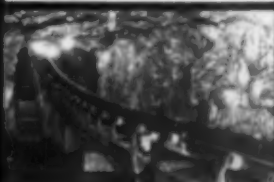
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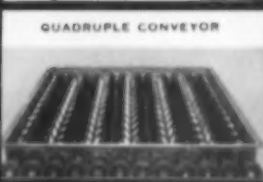
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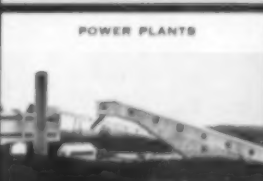
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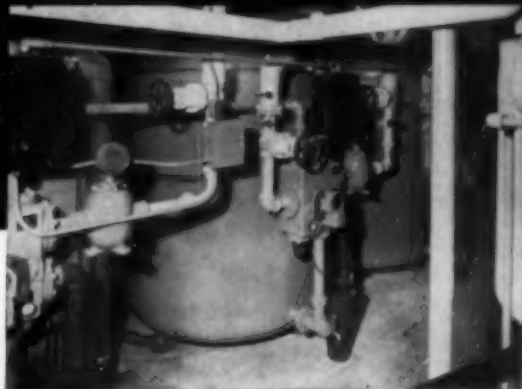
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